INDEX*

Transactions of American Society for Metals Volume LIV, 1961

Index of Authors

A	G
Adenis, Daniel Jean-Paul	Garofalo, F 430-444
Adzema, P. J	
Angerman, C. L	Goldberg, Alfred
Averbach, B. L	Goodwin, J. G
Averbach, D. L	Gregory, B
B	Grube, K. R
В	Grube, W. L
Bain, E. C 1-11	Gücer, D. E 176–184
Baldwin, W. M., Jr	Gurney, Sumner
Banerjee, B. R	
Beck, F. H	H
Bishop, Claude R	
Brophy, J. H	Hagglund, R. R 276-285
Brown, D. A	Hall, H. T
Bullock, G	Hauser, J. J 514-525
Bush, J. J	Heydt, G. B 220-226
Dusti, 9. 9	Hirth, J. P 456-465
С	Hull, J. L
•	
Capenos, J. M	T T
Carey, R. S 504-513	,
Chandhok, V. K	Jacobson, M. I
Cobb, Harold M	Jaffe, N 111-115
Cohen, Morris	Jaffee, R. I
Contractor, G. P 208-219	June 20 20 20 20 20 20 20 20 20 20 20 20 20
Couts, W. H., Jr 591-597	K
	N.
D	Kalish, Herbert S
P 1 * 0 P00 040	Kauzlarich, J. J
Darken, Lawrence S 598-642	Kirkpatrick, M. E
Deutsch, D. E	Klodt, D. T
Domis, W. F	Knight, D. J
Dorn, J. E	Kraft, R. W
Douglass, D. L	Mait, N. W
Dulis, E. J	
Dulis, E. J	L
Dulis, E. J	Larsen, W. L
Dulis, E. J	Larsen, W. L
Dulis, E. J	Larsen, W. L
Dulis, E. J. 456–465 E Elsea, A. R. 1–11 Ence, E. 158–167	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49
Dulis, E. J. 456–465 E E Elsea, A. R. 1–11 Ence, E. 158–167 F	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115
Dulis, E. J. 456–465 E E Elsea, A. R. 1–11 Ence, E. 158–167 F	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49
Dulis, E. J. 456–465 E Elsea, A. R. 1–11 Ence, E. 158–167	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115
Dulis, E. J. 456–465 E E Elsea, A. R. 1–11 Ence, E. 158–167 F Farrell, J. W. 143–157 Fletcher, E. E. 1–11	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115
E E Elsea, A. R. 1-11 Ence, E. 158-167 F Farrell, J. W. 143-157 Fletcher, E. E. 1-11 Flinn, R. A. 526-538, 549-566	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115 Lundin, C. E., Jr. 168–175
Dulis, E. J. 456–465 E E Elsea, A. R. 1–11 Ence, E. 158–167 F Farrell, J. W. 143–157 Fletcher, E. E. 1–11	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115 Lundin, C. E., Jr. 168–175
E Elsea, A. R. 1-11 Ence, E. 158-167 F Farrell, J. W. 143-157 Fletcher, E. E. 1-11 Flinn, R. A. 526-538, 549-566 Fontana, M. G. 539-548	Larsen, W. L. 580-590 Larson, Frank R. 481-503 Lorenz, Paul M. 466-480 Loria, Edward A. 31-49 Ludemann, W. D. 111-115 Lundin, C. E., Jr. 168-175
E Elsea, A. R. 1-11 Ence, E. 158-167 F Farrell, J. W. 143-157 Fletcher, E. E. 1-11 Flinn, R. A. 526-538, 549-566 Fontana, M. G. 539-548 * Compiled by Miss Evelyn H. Roberts, Greens-	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115 Lundin, C. E., Jr. 168–175 M Margolin, H. 158–167 Matthews, C. O. 84–95
E Elsea, A. R. 1-11 Ence, E. 158-167 F Farrell, J. W. 143-157 Fletcher, E. E. 1-11 Flinn, R. A. 526-538, 549-566 Fontana, M. G. 539-548	Larsen, W. L. 580–590 Larson, Frank R. 481–503 Lorenz, Paul M. 466–480 Loria, Edward A. 31–49 Ludemann, W. D. 111–115 Lundin, C. E., Jr. 168–175 M Margolin, H. 158–167

VOLUME 54, 1961

855

N W 4	
Morgan, W. A 208-219	Simnad, M. T
Mostovoy, S 567-579	Sinnott, M. J
_	Sponseller, D. L
N	Steigerwald, E. A
Nunes, John	Stephenson, E. T
Nunes, John	Stern, Milton
p	Stickler, R
	Sullivan, C. P
Pardue, W. M	
Peretti, E. A	T
Phillips, W. L., Jr 50-63	
Polakowski, N. H	Trojan, Paul K 549-566
	Turkalo, A. M 344-354
R	
	V
Radavich, J. F	Vinckier, A 362-380
Raymond, L 111-115	von Gemmingen, F
Reichenbach, G. S 413-429	von Geminingen, F 450 441
Rhines, F. N	w
Robinson, G. H 390-412	The state of the s
Rubenstein, L. S	Ward, W. V
Russell, P. G	Weeks, J. R
	Williams, D. N
S	Wray, P. J
Schempp, E. G	
Schweitzer, D. G	Y
	Vac V I
Sherby, Oleg D	Yao, Y. L
Shubert, F. L	Yun, T. S 129–142

Subject Index

A	Aging temperatures
Accuracy requirements of instruments	effect on strain hardening properties of sheet materials
for self-diffusion, correlation between experi- mental and calculated (F)	effect on solubility of U in Bi (A) (F) 201-207
of brittleness, in Armeo iron 382, 387, 388	electronegativities (T)
of softening, for 60% cold-rolled iron vs. reciprocal annealing temperature-time (F)	Alloying as strengthening process
Activity coefficient of Mg in Fe-base liquid (F) 564, 565	effect, added in combination 529-533 effect, added singly 527-529
Addition of alkali or alkaline earth metals to liquid alloys	effect of C, B, and M in combination 529-533
Additive effects of alloying elements on the me-	for Fe-18Ni-18Cr alloy
chanical properties of cast austenitic alloys at 1500°F (A) 526–538	additive effect on mechanical properties at 1500°F. (A)
Age hardening	Alloy steels
of lead-base alloys with Sb	carbides in
Aging properties of Ti-8Al-8Zr-1 (Ta + Cb)	yield behavior at low strain values (A)
158-167	Alloy systems
(A) title of article; (F) figure; (T) table.	self diffusion in

Alpha ferrite	of electrolytic iron, effect of concurrent strain-
fatigue runs data	ing (A)
repeated tensile loading (A) 299-321	of low-C steel 355, 358, 359
Alpha iron	effect on magnetic properties (F)
brittleness range	355, 358-360
in vacuum reduction	of vanadium, effect on properties 146
transformation into gamma iron calculation.	of zinc, single crystals 50
233	Annealing, dynamic
yield-point behavior	See Dynamic annealing
Alpha prime phase in 12% Cr steel	Antimony
identification	effect on Pb-base alloys 99
on Fe-Cr diagram (F) 464	solubility in Pb (T)
rates of nucleation and growth at 900° F	Antimony-bismuth-indium system
463, 464	
	constitution studies (A)
Aluminum	liquidus isotherms
creep curves for high purity (F) 112	metallography
creep in effect of substructure and stress de-	microstructure
creases (A)	phase study 12–19
creep vs. time in cantilever bending (F) with	Argon
temperature	cover on equilibrium equipment 553, 554
dynamic annealing in	effect on microstructure of Zircaloy-2
effect on 1500° properties of Fe-18Ni-18Cr	256, 257
alloy (T)	Armco iron
528, 531, 533, 536, 537	activation energy of brittleness 382
elongation vs. temperature with grain size	brittleness at 80°C 383, 384
(F)	ductility patterns vs. temperature 385, 386
minimum duetility and range 118, 120	ductility vs. aging time and temperature (F)
plastic flow constants (T)	386, 387
preparation of creep specimens 112	ductility vs. temperature (F) 381-383
Aluminum-nickel bonds	ductility vs. temperature of H-charged (F)
comparison of as fabricated and annealed	385, 386
(F)	elongation vs. temperature (F) 119
Aluminum-Ni-diffusion couples	hardness and treatment (T) for torsion test
identification of phases	569, 570
microstructure (F)	hydrogen in
x-ray patterns (T)	introduction of H into 383, 384
Al-Ni diffusion zones (fuel elements)	local shear bands in torsion (F) 571
identification	material and procedure 381–384
microstructure (F)	microstructure
	noxious and innocuous states of H in (A)
x-ray patterns (T)	381-389
Aluminum-Ni-U bonds (fuel elements)	voids in
metallographic study (A) 260–275	
quality of materials	Arrangement
tests for bond strength	conservation of
tests for corrosion resistance	of imperfections
Aluminum-oxygen clusters in silver 612–616	Arrhenius relation
Aluminum, pure	duetility of iron
centrifugal creep testing (A) 504-513	ASM Annual Dinner 690-691
composition (T)	ASM Annual Meeting 666–691
heat treatment (T)	ASM Awards Dinner 665
Aluminum-yttrium system	ASM Chapters and Officers 650–658
See Yttrium-aluminum system	ASM Constitution Additions 689
Anisotropy	ASM Distinguished Service Luncheon 691
mechanical, of sheet materials . 482, 493-497	ASM Election of Officers 690
of columbium	ASM Foundation for Education and Research
of hardening in direct shear for hexagonal	694-696
metals	ASM Managing Director's Report 684-688
of 422 stainless steel with ferrite 40, 41	ASM Medalists, Awards and Life Members
Annealing	644-646
in diffusion couples, effect on bond strength.	ASM Memorium to Ernest E. Thum. 692, 693
274	ASM Officers and Trustees
of a cold-worked metal, followed by polygoni-	ASM Presidential Address
zation and/or recrystallization 332	ASM Secretary's Report 671-677
Eation and of recrystanteation	Librar Secretary & Insportant Control of L Off

ASM Standing Committees 646-649	ferrite in (F)
ASM Technical Program at 43rd Annual Con-	"gray lines" in 399-401
vention	hardness vs. depth (F) 392, 393
ASM Treasurer's Report 678-683	slip in (F)
ASM Young Engineer's Day 691	stress-affected zone 409
Asperities in wear testing 277, 284	stringers in (F)
Asterism after deformation in Mg single crys-	Bearing steels
tals:	comparison of
Atomic mobility in metallic systems (A)	Bend ductility of vanadium
227-240	Bend resistance
Atomic radii of alkali metals (T) 207	of commercial Pb-1.5Cd-0.2Ni(T) 104
Atoms	of Pb and Pb-0.23Ni alloys with 4 additional
some observations on (A)	
Atom-vacancy exchange in diffusion 236, 237	metals (T)
	of Pb-Cd alloys (T)
Austenitic stainless steel	of Pb-Cd-Ni alloys
heat treatment	effect of composition (F) 101
intergranular corrosion 362, 363	Bend tests
Austenitizing	on 304 stainless steel 370, 371
of Armeo iron, H-charged effect on ductility	on vanadium
(F)	Beryllium
of medium-C steel	uses based on properties
Austenitizing temperatures	Beryllium sheet
for Cr-Mo-V steel, effect on weight and com-	chemical analyses (T)
position of carbides (F) 209-211	dimensions of test specimens (F) 87
for 422 stainless steel, with and without ferrite	ductility at various temperatures 88, 89
effect on ductility and grain size (F) 34	dynamic and static properties 84, 88, 94
Autographic load-elongation curves	edge profiles of as received (F) 86, 87
See Load-elongation curves	edge profiles of finishes (F)
	effect of surface finish on properties (A)
В	84-95
Bainite	fatigue tests
in bearing inner race (F) 398, 399	fracture in tensile testing
in medium-C steel 4	high- and low-temperature testing. 88, 89
Balanced chemistry of 422 stainless steel 31	impact energy vs. temperature for NMI
Ball bearings in bakelite test 66, 68	hot-upset (F)
Banded ferrite	impact tests
See Ferrite, banded	metallography
Barium	microstructure showing porosity (F) 90
solubility in liquid Bi (F) 186, 187, 197, 199	milled, transverse section (F)
Barium-bismuth alloy	notch sensitivity
Barium-bismuth alloy microstructure (F)	notched-tensile properties at 70°F (T) 90
Bauschinger effect in hexagonal metals 59	porosity (F)
BCC metals	
self-diffusion data (T)(F) 228, 229, 231	properties (T) 84, 85
	residual stress measurements (F) 92-94
Bearing inner races effect of load on stress affected zone (F) 395	S-N curve (F)
effect of time on stress affected zone (F) 393	surface preparation 85, 86, 87
	tensile properties vs. temperature (F) (T)
extrusion-intrusion mechanism 410	85, 88, 89 tensile tests
instability of	tensile tests
macroscopic changes under rolling contact	tension-tension fatigue properties 91, 92
392	Bismuth
material and test procedures 391, 392	effect of alkali metals on solubility of U in
microstructure (F) 392, 393, 397	(A)
plastic deformation in 390, 404	intermediate compounds with alkali metas
plastic flow	204, 207
residual stress changes (F) 404-411	solubility of fission products in liquid
threshold stress 395, 396, 397	185-207
Bearing inner races of 52100 steel	
bainite and cementite in (F)398-400	Bismuth-fission product system liquidus curves (A)
calculated contact stresses (T) 391	Bismuth-Indium-antimony system
correlation of stress and structural changes	constitution studies (A)
(F)	Blast furnace process
fatigue and fracture	direct and indirect reduction

Blue brittleness in Armco iron (F) 381, 382 Bonded wire-resistance strain gage 414	Carbide phase in low-C steel effect of quench temperature (T) 360
Bond strength in Ni-U couples effect by changing oxide configuration 274	effect on cooling from annealing temperature 355, 359, 360
improvement of	Carbide precipitation in 304 stainless steel
Bond strength test of diffusion couples 265	363-369
Boron	Cr depletion
effect on 1500°F properties of Fe-18Ni-18Cr	effect of heat treatments376-379
alloy (T)(F)	electron microscopy (F)
Boundaries (two dimensional singularities)	microstructure (F)
601	morphology 363-369, 374-376, 379
Bowden wear theory	Carbide precipitation in 316 stainless steel
Brass	430-444
composition and grain size (T) 121	agglomeration 435, 438, 443
experimental methods and results on minimum	correlation with creep rate 435
ductility	correlation with prestrain 443
tensile properties at intermediate temperatures	dislocations and
(T) 121	effect of mechanical-thermal treatments
Brass, 70/30	433-435
hardness and treatment for torsion test (T).	effect of prestraining on
569, 570	with prestraining and heat treatment
local shear bands in torsion (F) 571	Carbides 433–435
Brittle creep-rupture four criteria for	in Cr-Mo-V steel
minimum duetility and	composition and microstructure (A)
Brittle fracture from small defects 466	208-219
Brittleness	effect of austenitizing temperature on com-
of Armeo iron at -80°C	position (F)
of beryllium at room temperature 92	effect of tempering temperature on compo-
of iron	sition (F) 212, 213, 214
Brittleness at intermediate temperatures in Fe,	electrolytic extraction 209
Cu, Ni and their alloys	identification by x-ray analysis 215
Brittleness ranges	removal of
explanation for	in 304 stainless steel
in alpha iron	corrosion behavior and morphology (A)
in aluminum	in 410 stainless steels during tempering by
in gamma iron	different methods (F) 516-524
In titanium	in 4340 steel, after prestraining and retemper-
С	ing (F) 80-82
C	in 0.42% C steel with varied temperings (F)
Cadmium	346, 347, 353
effect on lead-base alloys 96-105	temperature dependence of morphology (F)
effect on Pb-Ni alloy 99, 100	366, 374, 375
solubility in Pb (T)	Carbide stringers in 422 stainless steel (F)
Cadmium single crystal	32, 33
c/a ratio	Carbon
Cahn and Fullman sphere-size distribution	diffusion in direct reduction 129, 134–136, 141
Gamphell Memorial Lecture 508	effect on corrosion resistance of Ti-20 Mo
Campbell Memorial Lecture	alloys
See Centrifugal creep test	effect on mechanical properties of Ti-Mo
Cantilever-bend test	alloys
specimen dimensions and profiles (F)	effect on 1500°F properties of Fe-18Ni-18Cr
507, 509	(T)(F) 528, 529, 531
test procedure 508	effect on 1500°F properties of Fe-18Ni-18Cr
Capacitance gages for residual strains 428	alloy with B and Mo (T)(F) 532-534
Capacitance strain gage (F) 414, 415	effect on solubility of Mg 560
C/A ratio	in low-C steel effect on magnetic properties
for Cd, Mg and Zn crystals 50, 58	(F)
for hexagonal metals with deformation 50, 58, 59	percentage in carbides with austenitizing tem- perature (F)
30, 30, 33	Personic (1)

percentage in carbides with tempering tem- perature (F)	effect on solubility of U in Bi. 203, 204, 206 Charpy impact testing of stress corrosion crack
Carbon dioxide in vacuum reduction	ing types
Carbon extraction replica technique	of Be sheet (T)
for Cr-Mo-V steel	of Zircaloy 2-oxygen alloys 22, 23
for 304 stainless steel	Chord length data
Carbon monoxide	ball bearings in bakelite test 66, 68
in reduction processes 129, 130	for ductile cast iron (T)(F)
in vacuum reduction . 130, 131, 134-136, 141	
Contain reduction of ferris swide 190-149	on ball size distribution (F)
Carbon reduction of ferric oxide 129-142	
Carbon solution	solution (T) 67
definition	Chromium
in reduction process	diffusion in
Carbon steel	percentage in carbides with austenitizing
deformation 577	temperature (F)
effect of Cb on hardenability and properties	percentage in carbides with tempering tem-
of 0.35 (F)(T)	perature (F)
electron transmission study of martensites in	Chromium carbides in 304 stainless steel
0.42 (A) 344-354	time and temperature dependence of precipi-
pearlite spacing in eutectoid (A) 106-110	tation
plastic flow constants for 0.05%, 0.40%,	Chromium depletion theory
0.59% (T)	in corrosion of stainless steel 372-374
temper embrittlement in	in intergranular corrosion of Cr steels.
torsional ductility 577, 578	520, 524
Cartridge brass	
composition and grain size (T) 121	Chromium impoverishment theory 362, 363 Chromium-iron system
elongation vs. temperature (F)	See Iron-chromium
grain boundary shearing (F)	Chromium-Mo tool steel sheet
microstructure (F)	composition and gage (T)
tensile properties (T)	heat treatment and tempering (T) 484
Cast austenitic alloy	plastic flow analyses 481-504
development of maximum rupture strength at	strain hardening properties 486
1500°F	test procedure (T)
Casting-section size	true stress-strain properties vs. tempering
effect on graphite sphere size in ductile cast	temperature (F)
iron	Chromium steel
Cavities and ductility in monel 126, 127	Cr depletion theory of intergranular corro-
Cementite	sion 520, 524
in bearing inner races (F) 398-400, 404	Chromium steel (12%)
in low-C steel, formation from annealing (T).	fatigue, damping characteristics and micro-
360	structure (A) 456-465
Centrifugal creep-tension test 504, 506	high-temperature properties and uses 456
effect of temperature on creep (F). 510, 511	Chromium steel, 12% modified
Centrifugal creep test	See Stainless steels, special types 422
advantages of	Coefficient of friction of 1040 steel 282
compared to conventional tests510, 511, 513	Coercive force in low-C steel
compared to conventional tests 510, 511, 513	
equipment for (F)	effect of carbide form on (T)
tension head (F)	effect of grain size and C content (F) 359
test procedure	Cold deformation, creep properties and 433
Centrifugal creep testing of pure aluminum	Cold fabricability of Zircaloy-2-oxygen alloys
(A)	(F)
effect of temperature on (F) 511	Cold rolling
effect of thickness (F)	effect on hardness of V (F)
validity of temperature-time law (F) 512	Cold work of Ti-8Al-8Zr-1(Ta + Cb)(F). 159,
Centrifugal creep testing of 4330M steel	
508-510	163, 164
Cerium	Columbium
solubility in Bi and Bi-Sm (F) 188, 192,	anisotropy in single crystals (A) 322-330
197, 199	effect on hardenability of Al-killed medium-C
Cerium-samarium-bismuth	steel (F) 4-7
interaction of fission products 188, 192	effect on impact-transition temperature in
Cesium	medium-C steel (F) 9-11

effect on mechanical properties of medium-C	Copper, OFHC
steel, Al-killed 6-11	hardness and treatment for torsion test (T)
effect on properties of Al-killed, medium-C	569
steel	Copper and its alloys
effect on 1500 F properties of Fe-18 Ni-18 Cr alloy (T)	elongation vs. temperature (F)
effect on resistance to grain growth in medium-	118
carbon steel (F)	maximum stress vs. temperature (F) 118
effect on response to heat treatment in Al-	reduction in area vs. temperature (F) 118
killed medium-C steel 2, 3	Correlation of stress and structural changes
effect on tempering of medium-C steel, Al-	in bearing inner races (F) 408-410
killed 5–7, 11	Corrosion currents in stress corrosion
effect on tensile properties of 0.35 C steel (T).	effect of Fe content, grain size and cooling
8, 11	rates (T)
hardness anisotropy in (A) 322–330	effect of plastic deformation on (F) 545
hardness vs. reduction	measurement of
Knoop hardness of single crystals $(F)(T)$ 323, 325	reproducibility of
Laue photographs of crystals 322, 324	vs. time in transgranular failure (F) 547
Mathematical analysis of hardness aniso-	Corrosion data on Zircaloy-2
tropy	metallographic evaluation 256
solubility in Bi	metallurgical evaluation 256-258
Columbium carbide	statistical analyses 252, 253
interdendritic nature (F)	visual examination 253, 256
microstructure (F)	Corrosion-fatigue testing
solubility in medium-C steel 4, 11	on Pb-base alloys
Columbium steel	Corrosion in Ni-U couples electron micrographs (F)
softening with increasing tempering tempera- ture (F)	Corrosion inhibitors in liquid metal fuels
softening with increasing time at 1060 F (F).	185 109 100
7	Corrosion resistance
temper embrittlement in 10, 11	of 10 metals and alloys (F) 295
Combination of climb and cross slip in creep	of Pb-Cd-Ni alloys (T) 103, 104
506	of Pb -0.05 Cu alloy (T) 104
activation energy by 512	of 410 stainless steel
Composition of carbides in Cr-Mo-V steel	of Ti and Ti alloys (field tests) 293-296
208-219	of Ti-Mo alloys containing noble metals 286-298
Compression stress vs. compression	of Ti-Mo alloys in various media (T)
for monel (F)	287-289
for 0.09 C Thomas steel (F)	of Ti-20% Mo-0.2% Pd alloy 293
Concept of identity	of Zircaloy-2, effect of fabrication variables
Concrete, measurement of air bubbles in	(A)
65, 70	Corrosion resistant materials
Concurrent straining and annealing	for reducing and oxidizing environments (F).
in cold-rolled iron (A) 331-343	295
in gold-silver alloy	Corrosion tests
in zinc	on 304 stainless steel 365, 366–369
Conservation of arrangement 601	Crack geometry in fracture toughness test (F)467, 468,
Conservation of mass	475, 476
Cooling (slow) of low-C steel	Crack growth with superimposed sonic impulses
effect on magnetic properties (F) 359	(F)
Constitution	Crack instability
of Sb-Bi-In system	method of determination
of Ti-8Al-8Zr-1(Ta + Cb)(A) 158-167	Crack preparation
Constitution studies of the Indium-Rich Portion	in fracture toughness test (F) 468, 472
of the System Antimony-Bismuth Indium	stress-crack relationships (F) 471, 473
(A)	Crack propagation in fatigue speed
Copper	role of ductility 300
local shear bands in torsion (F) 572	Cracking in notch tests
plastic flow constants (T) 153	types and operation

"Cracking severity rating" in stainless steel (F) 368, 370	Creep testing (centrifugal) of pure aluminum (A)
Cracks in cementile and ferrite in fatigue tests (F)	See Centrifugal creep testing Critical resolved shear stress
315-316	agreement between tension and shear 63
Creep	Cr-Mo-V steel
cold deformation and	composition and microstructure of carbides in (A)208-219
ture 505, 506	composition of carbide and matrix with varied
stages of at high temperature 431	heat treatments 208-219
Creep behavior	mechanical properties (F) 209, 210
dislocations and	12% Cr-Mo-W-V steel
grain boundary shearing and slip in 431, 432	influence of delta ferrite-carbide segregates on
of an austenitic stainless steel as effected by	properties (A) 31-49
carbides (A)	See also Stainless steel
microstructure and	Cross-slip mechanism in creep 506
of Pb-base alloys	activation energy by
of Pb-Cd-Ni alloys	Crucible materials
effect of composition on room temperature	in equilibrium study
(F)	Crystal imperfections
of 316 stainless steel	Crystal structure
effect of mechanical-thermal treatments.	in reduction of ferric oxide (T) 136, 138-141
435-443	of intermediate phases of Ni-Hf system (T)
Creep in aluminum	589
activation energy for (T)111, 112, 508,	of pure metals (T)
511-513	of various Ni-Zr intermediate compounds.
effect of stress decrease in primary stage (F).	585-587
113	Crystals
effect of stress decrease in secondary stage	dislocation theory 602
(F) 114	Crystals single
effect of substructure and stress 111-115	dislocation behavior
equipment	preparation
specimen preparation	strain hardening and dislocations 61, 62
Creep rate	Cumulative cycle ratios
in aluminum	for pressure-vessel steels (T)
effect of stress and substructure. 111-115	Cumulative fatigue at high plastic strains (A).
in 316 stainless steel	176–184
correlation with carbide precipitation. 435	Cycling experiments in shear stress
correlation with rupture life 442, 443 effect of prestraining stresses. 435, 440, 441	on Mg single crystals
effect of treatments on (F) 440	D
of lead-base alloys 96-98	_
effect of Ni	Damage-cycle ratio
of lead-nickel dispersion alloys (T) 98	for pressure-vessel steels (F) 178–183
of Pb and Pb-0.23 Ni alloys with 4 additional	Damage (steel)
metals (T)	constant, contours (F)
of Pb-Cd-Ni alloys dependence on balanced	Damping characteristics
composition100, 13	in 12% Cr steel
Creep rupture tests	fatigue, microstructure and (A) 456-465
for 316 stainless steel	Daniels and Dunn analysis
with varied treatments (T) 435, 440, 441	on deformation in hardness testing 326
Creep stress-strain relationships	De-boronization
mathematical analysis 505, 506	of Ni-4.5 Al-3.5 Ti alloy at 1900 F 591-597
theoretical approach 505, 506	Deformation behavior
Creep test (conventional)	of hexagonal metals
compared with centrifugal creep test. 510,	c/a ratio and
511, 513	Deformation in hardness indentation
Creen test specimens	Daniels and Dunn analysis
Creep test specimens dimensions	Deformation in torsion
effect of thickness (F)	Deformation process
	Delta ferrite-carbide segregates in 12% Cr-Mo-
fiber stress in	W-V-steel
profiles after test (F)	influence on properties (A)

Delta ferrite in 12% Cr steel	analysis by
effect on fatigue (F)	plastic deformation and 623-629
electron micrograph (F)	Dislocation movements in crystals
precipitate during fatigue test 458, 459	strain hardening and 59, 60
x-ray diffraction and electron probe analysis	Dislocation structures
(T)	in 410 stainless steels with tempering, election
Delta ferrite in 422 stainless steel	microscopy of (F) 521-524
decomposition into lamellar microstructure	***
(F)	Of crystals
effect in longitudinal and transverse impact	Dislocations
tests (T)	in martensitic structure at 800 F tempering
effect in longitudinal stress-rupture (T) 43	and higher (F) 349-351, 353
effect in unnotched and notched fatigue tests	in slip planes, creep and
(T)	in 316 stainless steel, treatments to control.
limiting amount	430
microstructure (F)	in 4340 steel, released by prestraining
Delta ferrite in 431 stainless steel 31	72, 80, 82
Density of Be sheet (T)85	Dislocations (one-dimensional singularities)
Destructive instability in torsion (A) 567-579	601
Diamond structure metals	Dispersion alloying
self-diffusion data (T)(F) 228, 229, 233	of Pb-base alloys with 8 metal powders
Diffusion	
constants for pure metals (T)	97, 98, 99 Dispersion hardening
discussion of empirical equation for . 235-238	of Pb-Cd-Ni alloys 96-105
ferromagnetism and	Dissection technique
in direct reduction, hypotheses 135, 136	Dissection technique limitations of
of carbon atoms into FeO	D-R diagram
of iron ions within oxide crystal 129	for pressure-vessel steels (F) 178-183
of polymorphic metals 233, 234	Dry friction wear
Diffusion couples	in medium C-steel (F) 276, 277
bond-strength test	in 1040 steel, effect of temper brittleness (A).
fabrication	276–285
metallography	procedure and apparatus 278, 279
phase identification	Ductile cast iron
pinhole corrosion test	chord length data (T)(F)
x-ray diffraction analysis	composition of 3 heats (T)
Diffusion in substitutional alloys	graphite size in (A)
mechanisms for	metallography
Diffusion law analysis	microstructure (F)
in vacuum reduction of ferric oxide (F)	Ductility
135-137	embrittlement and
Diffusion-temperature range	investigation of, at intermediate temperatures
of pure metals (T)	(A)
Diffusion zones in as-bonded fuel elements	minimum, in various metals and alloys.
element of Ni-U (F)	117, 118
identification	Notch sensitivity and
in Ni-U couple (F)	of Armeo iron vs. aging time and temperature
Direct reduction of ferric oxide by solid carbon	(F)
in vacuum (A)	of Armco iron vs. temperature (F). 381–385
Directionality	of Be sheet
effect in fatigue	effect of temperature
in plastic flow	of Fe-18Ni-18Cr alloy
of nonmetallic inclusions and segregates from	effects of elements to improve 533-538
hot working	
Discontinuous precipitation	of Fe-18Ni-18Cr alloy, plus C, B and Mo effect of compositional adjustments (T).
in Ti-8Al-8Zr-1(Ta + Cb) 164, 166	537, 538
Discussion of Papers	effect of spheroidization (F) 534-536
Dislocation behavior	
in single crystals	of H-charged Armco iron effect of austenitizing (F)
Dislocation-climb mechanism in creep 506	
	of monel
	of magnetalligad wandium we tomporeties
activation energy by	of recrystallized vanadium vs. temperature
in aluminum	of recrystallized vanadium vs. temperature (F)

of steel 33, 34, 48 of steel 7. The stemperature of the steel of surface finish on properties of aluminum in the dislocation climb region (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium in the dislocation climb region (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium definition. A 237, 328 Effect of surface finish on properties of beryllium sheet (A). Effect of temperature exposure on the microstructure of 4.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 4.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Effect of temperature exposure on the microstructure of 1.541.3-517 inkelo-base alloy (A). Electron-probe analysis of 410 stainless steel.		
relation to wear-rate. 277 vs. temperature, three dimensional graph (F). 278 of 1040 steel relation to wear. 284 of 4340 steel after prestraining and retempering. 77-82 Dynamic annealing definition. 332 of cold-rolled electrolytic iron. 337-332 effect on hardness (F). 339, 340 tests for. 332, 333 microstructure and (F). 339, 340 tests for. 332, 333 **Earting** in deep drawing. 322 Edge profiles of Be sheet (F). 343-343 telect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of stress decreases on the properties of Ziraeloy-2. Effect of surface finish on properties of Davidson in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 340-351 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature on hardness, retained austenitie and elastic limits for 5 steels (F). 4226 of M-3 steel (F). 4276 of M-2 steel (F). 4286 of M-3 steel (F). 4287 o	of 422 stainless steel containing ferrite31, 33, 34, 48	Electron-donor elements to Bi 204, 205 Electron microscopy
relation to wear-rate. 277 vs. temperature, three dimensional graph (F). 278 of 1040 steel relation to wear. 284 of 4340 steel after prestraining and retempering. 77-82 Dynamic annealing definition. 332 of cold-rolled electrolytic iron. 337-332 effect on hardness (F). 339, 340 tests for. 332, 333 microstructure and (F). 339, 340 tests for. 332, 333 **Earting** in deep drawing. 322 Edge profiles of Be sheet (F). 343-343 telect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of stress decreases on the properties of Ziraeloy-2. Effect of surface finish on properties of Davidson in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 340-351 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base aloly (A). 359-397 Effect of temperature on hardness, retained austenitie and elastic limits for 5 steels (F). 4226 of M-3 steel (F). 4276 of M-2 steel (F). 4286 of M-3 steel (F). 4287 o	of steel	
relation to wear. of 14340 steel after prestraining and retempering. of cold-rolled electrolytic iron. 337-342 of cold-rolled electrolytic iron. 337-338 microstructure and (F). 339, 340 tests for. 332, 333 tests for. 332, 333 Egg profiles of Be sheet (F). 840, 331-343 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). 20-30 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron. A) 20-30 Effect of surface finish on properties of aluminum-in the dislocation climb region. A) 20-30 Effect of surface finish on properties of pluminum-wine the dislocation climb region. A) 50-62-63 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base al	relation to wear-rate	
of 1040 steel relation to wear of 4340 steel after prestraining and retempering. 77–82 Dynamic annealing definition. 332 of cold-rolled electrolytic iron. 337, 338 effect on hardness (F). 339, 340 tests for. 332, 333 Effect on hardness (F). 339, 340 tests for. 332, 333 Egy Edge profiles of Be sheet (F). 86, 87 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). 111–115 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331–343 Effect of oxygen on the properties of Zircaloy-2 (A). 20–30 Effect of prestraining and retempering on AISI type 4340 steel (A). 72–83 Effect of surface finish on properties of beryllium sheet (A). 111–115 Effect of surface finish on properties of beryllium definition. sheet (A). 112 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti (Nickel-base alloy (A). 266 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti (Nickel-base alloy (A). 273 of M-2 steel (F). 422 of M-2 steel (F). 423 of M-2 steel (F). 424 of M-50 steel (F). 425 of S2100 steel (F). 426 of M-4 steel (F). 427 of M-50 steel (F). 427 of M-50 steel (F). 428 Elastic limit definition. 209 Electrolytic iron effect of concurrent straining on annealing behavior (A). 331–343 Electron diffraction data on A 286 (T). 233 of Cr earbides in 304 stainless steel (F). (F). 6 Cr-Mo-V steel, with varied heat treatments. 2144–217 of M-4.5G steel (F). 26, Mi-1 as bonded fuel element (F). 260 6 4340 steel (F). 397–490, 410 514–525 6 4340 steel (F). 397–491, 410 514–525 6 4340 steel (F). 397–493, 411 514–525 6 4340 steel (F). 397–491, 410 514–525 6 4340 steel (F). 397–491, 410 514–525 6 4340 steel (F). 397–491, 410 51		
of 1040 steel relation to wear		
relation to wear. of 4340 steel after prestraining and retempering. Dynamic annealing definition. 320 cold-rolled electrolytic iron. 337-342 effect on hardness (F). 339, 340 tests for. 332, 333 microstructure and (F). 339, 340 tests for. 332, 333 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A). 331-343 Effect of oxygen on the properties of aluminum in the dislocation climb region (A). Effect of surface finish on properties of aluminum in the dislocation climb region (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). Effect of surface finish on properties of beryllium sheet (A). 591-597 Effective resolved shear stress as function of indent or orientation (F). 273 of Cr carbides in 304 stainless steel (F). 506, 377, 373 of Cr-Mo-V steel, with varied heat treatments. 214-215. 514-525 of 514-525 of 52100 steel (F). 508, 57 Effect of concurrent straining on the annealing behavior (a). 331-343 Effect of surface finish on properties of aluminum in the dislocation climb region (A). 111-115 Effect of temperature exposure on the microstructure of 4.541-3.517 in vikel-base alloy (A). 50-52100 steel (F). 422-61 6140 stainless steel after tempering (A). 514-525 of 52100 steel (F). 526-61 64340 steel (F). 526-62-638 Effect of temperature exposure on the microstructure of aluminum in the dislocation climb region (A). Effect of temperature on hardness, retained austenite and elastic limits for 5 steels (F). 65-100 steel (F). 62-20-30 Effective resolved shear stress as function of indent or orientation (F). 52-61 52-62-62-638 Effect of temperature on hardness, retained auste		
of eld-rolled electrolytic iron 337-342 effect on hardness (F) 339, 340 tests for 329 Edge profiles of Be sheet (F) 88, 87 Effect of columbium on the properties of aluminum-hum-killed, medium-earbon steel (A). 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of stress decreases on creep of aluminum in the dislocation climb region (A). 111-115 Effect of surface finish on properties of Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 82-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature on bardness, retained austenite and elastic limits for 5 steels (F). 425 of 52100 steel (F). 425 of 5210		
Dynamic annealing definition 332 of cold-rolled electrolytic iron 337-342 effect on hardness (F) 339, 340 tests for 332, 333 microstructure and (F) 339, 340 tests for 332, 333 Belectrolytic iron (A) 327-342 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A) 1-11 Effect of concurrent straining on the namealing behavior of a cold-rolled vacuum-melted electrolytic iron (A) 20-30 Effect of prestraining and retempering on AISI type 4340 steel (A) 72-83 Effect of surface finish on properties of luminum in the dislocation climb region (A) 111-115 Effect of surface finish on properties of prestraining and retempering on AISI type 4340 steel (A) 72-83 Effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 222 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature exposure on the microstructure of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit definition 422 effect of temperature of 4.5Al-3.5Tl Nickel-base allow (A) 72-83 Elastic limit 4.5Al-		
Dynamic annealing definition 337 of cold-rolled electrolytic iron 337-342 effect on hardness (F). 337, 338 microstructure and (F). 339, 340 tests for. 332, 333 tests for. 332, 333 at section of the properties of aluminum state (A). 345-353 of Ni-4.5Al-3.5Ti alloy (F). 591, 592, 594-596 of Ni-U as bonded fuel element (F). 268 of Ni-U diffusion zones (F). 397-403, 411 microstructure of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 effect of oxygen on the properties of Zircalov-2 (A). 20-30 effect of prestraining and retempering on AlSI type 4340 steel (A). 72-83 effect of surface finish on properties of beryllium sheet (A). 84-95 effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 effective resolved shear stress as function of indent or orientation (F). 327, 328 effect of temperature exposure on hardness, retained austenite and elastic limits for 5 steels (F). 4227 of M-2 steel (F). 4225 of 52100 steel (F). 42		
of cold-rolled electrolytic iron 337-342 effect of nardness (F) 339, 340 tests for 332, 333 "Earling" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of aluminum-killed, medium-earbon steel (A). Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A). 331-343 Effect of oxygen on the properties of Zircaloy-2 (A). 20-30 Effect of prestraining and retempering on AISI type 4340 steel (A). 72-83 Effect of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effect of temperature exposure on the microstructure of 1.54-517 Effect of temperature exposure on the microstructure of 1.54-517 Effect of temperature on hardness, retained austenite and elastic limits for 5 steels (F). 427 of M-2 steel (F). 427 of M-50 steel (F). 428 of M-4 steel (F). 427 of M-50 steel (F). 428 of 340 steel (F). 427 of M-50 steel (F). 427 of M-50 steel (F). 427 of M-50 steel (F). 428 of M-4 steel (F). 427 of M-50 steel (F). 428 of 440 c tambers of beryllium sheet (A). 84-95 Electrical retrieval of the control o		
ments ructure and (F) 339, 340 tests for 345, 345, 357 tests for 345, 357 tests for 345, 357 tests for 345, 358 tests for 345, 357 test first in 401s test for 514-525 tests of 3430 steel (F) 397-403, 411 tests for 347 tests for 345, 357 tests in 445 tests for 347 tests for 345, 357 tests for 345 tests for 347 test first in 401s test for 347 test first in 401s test for 347 test first in 401s test for 347 test for 345 test for 347 test first in 401s tests for 344, 345 tests of 3450 steel (F) 397-403, 411 tests for 347 test first in 401s test for 347 test first in 401s test for 347 test first in 401s test for 347 test for 340 steel (F) 397-403, 411 tests for 3440 steel (F) 397-403, 411 tests for 3440 steel (F) 397-403, 411 tests for 3440 steel (F) 397-403, 411 tests		
tests for		
Earing" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of aluminum-killed, medium-earbon steel (A) 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A) 331-343 Effect of oxygen on the properties of Zircaloy-2 Gffect of prestraining and retempering on Al81 type 4340 steel (A) 72-83 Effect of surface finish on properties of beryllium in the dislocation climb region (A) 111-115 Effect of surface finish on properties of beryllium sheet (A) 515-517 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591-597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Eastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423 of M-5 oxteel (F) 422 of M-5 oxteel (F) 423 related to strain gage data 425 Elastic modulus of vanadium (T) 153, 154 Electrol recisivity of 410 stainless steel (F) 423 related to strain gage data 425 Elastic modulus of vanadium (T) 153, 154 Electrolytic extraction of carbides from steel ablation of concurrent straining on annealing behavior (A) 331-343 Effect of concurrent straining on annealing and retempering at various temperatures (F) 516 Electrolytic iron (A) 331-343 Effect of temperature stress in from the properties of aluminum in the dislocation of medium-corporation of specimens for transmission micrographs illustrating dislocations, precipitation, grain growth, etc., metals under plastic deformation. 602-638 preparation of specimens for transmission micrographs illustrating dislocations, precipitation of 344,045 teel (F). 80-82 Effect of temperature on hardness, retained austenite and elastic limits for 5 steels (F). 423 of M-50 steel (F). 423 of M-50 steel (F). 423 of M-50 steel (F). 423 of M-50		
rearing" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of alumnum-killed, medium-carbon steel (A) 52100 steel under rolling contact (F) 80-82 of 4340 steel (F) 80-82 of 4340 steel (F) 80-82 of 4340 steel (F) 80-82 of 52100 steel under rolling contact (F) 80-82 of 4340 steel (F) 80-		
**Earing" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of alumnur-killed, medium-carbon steel (A). 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A) 331-343 Effect of oxygen on the properties of Zirealoy-2 (A) 20-30 Effect of prestraining and retempering on AISI type 4340 steel (A) 72-83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A) 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base aloly (A) 591-597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423 of M-50 steel (F) 423 of 410 stainless steel 432-435, 439 of 410 stainless steel 515, 518, 519 Electron transmission microscopy of martensitic C steel (A) 344-354 of 410 steel (F) 425 of M-4 steel (F) 427 of M-2 steel (F) 423 of M-50 steel (F) 423 related to strain gage data 425 of 52100 steel (F) 423 related to strain gage data 425 of 52100 steel (F) 424 425 of M-4 steel (F) 327, 328 331-343 related to strain gage data 425 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423 related to strain gage data 425 effect of temperatures (F) 424 of 440 C steel (F) 425 of 52100 steel (F) 423 of 410 stainless steel (F) 424 of 440 C steel (F) 424 of 440 C steel (F) 425 of 310 stainless steel 515, 518, 519 telectronegativities of alkali metals (T) 207 telectronegativities of alkali metals (T) 207 telectronegativities of alkali metals (T) 207 telectronegativities of alkali metals (T)	tests for	
"Earing" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A) 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A) 331-343 Effect of oxygen on the properties of Zircaloy-2 (A) 20-30 Effect of prestraining and retempering on AlSI type 4340 steel (A) 72-83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A) 111-115 Effect of surface finish on properties of beryllium sheet (A) 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591-597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Effect of temperature exposure on hardness, retained austenite and elastic limits for 5 steels (F) 423-427 of M-2 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 427 of M-50 steel (F) 428 related to strain gage data 425 effect of temperatures and elastic limits for 5 feels (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 428 related to strain gage data 425 effect of temperatures and elastic limits for 5 feels (F) 423 related to strain gage data 425 effect of temperatures (F) 516 Electrolytic extraction of carbides from steel behavior (A) 331-343 electron diffraction data on A 286 (T) 223		of Ni-U as bonded fuel element (F) 268
"Earing" in deep drawing 322 Edge profiles of Be sheet (F) 86, 87 Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A) 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A) 331-343 Effect of oxygen on the properties of Zircaloy-2 (A) 20-30 Effect of prestraining and retempering on AlSI type 4340 steel (A) 72-83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A) 111-115 Effect of surface finish on properties of beryllium sheet (A) 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591-597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Effect of temperature exposure on hardness, retained austenite and elastic limits for 5 steels (F) 423-427 of M-2 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 426 of M-4 steel (F) 426 of M-4 steel (F) 427 of M-50 steel (F) 428 related to strain gage data 425 effect of temperatures and elastic limits for 5 feels (F) 426 of M-4 steel (F) 427 of M-2 steel (F) 428 related to strain gage data 425 effect of temperatures and elastic limits for 5 feels (F) 423 related to strain gage data 425 effect of temperatures (F) 516 Electrolytic extraction of carbides from steel behavior (A) 331-343 electron diffraction data on A 286 (T) 223	R	of Ni-U diffusion zones (F)
*Earing" in deep drawing. 322 Edge profiles of Be sheet (F)	Control to the control of the contro	
Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A)	"Earing" in deep drawing	
Effect of columbium on the properties of aluminum-killed, medium-carbon steel (A). Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A). S131-343 Effect of oxygen on the properties of Zircaloy-2 (A). (A). 20-30 Effect of prestraining and retempering on AISI type 4340 steel (A). T11-115 Effect of stress decreases on creep of aluminum in the dislocation climb region (A). T11-115 Effect of surface finish on properties of beryllium sheet (A). S11-11-15 Effect of temperature exposure on the microstructure of 4.5A1-3.5T1 Nickel-base alloy (A). S01-597 Effective resolved shear stress as function of indent or orientation (F). S27, 328 Effect of temperature exposure on hardness, retained austenite and elastic limits for 5 steels (F). 423-427 of M-2 steel (F). 424-427 of M-50 steel (F). 425-457 of M-2 steel (F). 426 of M-4 steel (F). 427 of M-50 steel winder rolling contact (F). 307-403, 411 S10-2-638 Effect of stress decreases on creep of aluminum in the dislocation climb region (A). S11-517 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., metals under plastic deformation. 602-638 Electron-probe analysis of 410 stainless steel. Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 343-4353. 516-517 Electron transmission microscopy of martensitic C steel (A). 342-3435, 439 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 310-318 Electron transmission microscopy of martensitic C steel (A). 342-345, 439 of 316 stainless steel. 310-318 Electron transmission micrographs illustrating dislocations, slip, crain growth, etc., metals under plastic deformation. 602-638 Electron-probe analysis of 410 stainless steel. Electron-probe analysis of 410 stain		
num-killed, medium-carbon steel (A). 1-11 Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-metted electrolytic iron (A). 337-403, 411 over 40 examples of dislocations, slip, grain growth, etc., metals under plastic deformation. 397-403, 411 over 40 examples of dislocations, slip, grain growth, etc., metals under plastic deformation. 397-403, 411 over 40 examples of dislocations, slip, grain growth, etc., metals under plastic deformation. 602-638 preparation of specimens for transmission tests. 344, 345 procedure. 266ete of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effective resolved shear stress as function of indent or orientation (F). 327, 328 Elastic limit definition. 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 423-427 of M-2 steel (F). 424 of 440 C steel (F). 425 of 450 C steel (F). 426 of M-3 steel (F). 427 of M-50 steel (F). 428 effect of straining and retempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 429 effect of temperature on hardness, retained austenite and elastic limits for 5 steels (F). 429 of M-2 steel (F). 429 of M-3 steel (F). 429 of 40 total termpering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 429 effect of steel (F). 429 of M-2 steel (F). 429 of M-3 steel (F). 429 of 410 stainless steel. 432-435, 439 of 410 stainless steel. 515, 518, 519 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 610-15 transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys of alfestainless steel. 610-15 transmission micrographs illustrating dislocations, precipitation, of alfestainless steel.		
Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-meted electrolytic iron (A)		
Effect of concurrent straining on the annealing behavior of a cold-rolled vacuum-melted electrolytic iron (A)		
behavior of a cold-rolled vacuum-melted electrolytic iron (A)		
electrolytic iron (A) 331–343 Effect of oxygen on the properties of Zircaloy-2 (A) 20–30 Effect of prestraining and retempering on AISI type 4340 steel (A) 72–83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A) 111–115 Effect of surface finish on properties of beryllium sheet (A) 84–95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591–597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 425 of M-2 steel (F) 426 of M-4 steel (F)		
Effect of oxygen on the properties of Zircaloy-2 (A) 20-30 (Bffect of prestraining and retempering on AISI type 4340 steel (A) 72-83 (Bffect of stress decreases on creep of aluminum in the dislocation climb region (A) 111-115 (Bffect of surface finish on properties of beryllium sheet (A) 84-95 (Bffect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591-597 (Bffective resolved shear stress as function of indent or orientation (F) 327, 328 (Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423-427 of M-2 steel (F) 426 of M-50 steel (F) 427 of M-50 steel (F) 422 elastic modulus of vanadium (T) 153, 154 (Electrical resistivity of 410 stainless steel with tempering at various temperatures (F) 516 (Electrolytic iron effect of concurrent straining on annealing behavior (A) 331-343 (Electron diffraction data on A 286 (T) 223		
Effect of prestraining and retempering on AISI type 4340 steel (A). 72-83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effective resolved shear stress as function of indent or orientation (F). 327, 328 Elastic limit definition. 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 423-427 of M-2 steel (F). 423 of M-0 steel (F). 424 of 440 C steel (F). 425 of 52100 steel (F). 423 related to strain gage data. 425 Elastic modulus of vanadium (T). 153, 154 Electrical resistivity of 410 stainless steel with tempering at various temperatures (F). 516 Electronytic iron 209 Electronytic iron effect of concurrent straining on annealing behavior (A). 331-343 Electron diffraction data on A 286 (T). 223		
tests 344, 345 type 4340 steel (A) 72-83 Effect of stress decreases on creep of aluminum in the dislocation climb region (A) 111-115 Effect of surface finish on properties of beryllium sheet (A) 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A) 591-597 Effective resolved shear stress as function of indent or orientation (F) 327, 328 Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423-6 of M-2 steel (F) 423-6 of M-50 steel (F) 423-6 of M-50 steel (F) 425-6 of M-50 steel (F) 425-6 of 52100 steel (F) 425-6 of 52100 steel (F) 425-6 of 52100 steel (F) 425-6 condulus of vanadium (T) 153, 154-6 Electrical resistivity of 410 stainless steel with tempering at various temperatures (F) 516-517 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address) 602-638 Electron transmission microscopy of martensitic C steel (A) 344-354-354-354-354-354-354-354-354-354-		
Effect of stress decreases on creep of aluminum in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effective resolved shear stress as function of indent or orientation (F). 222 Effect of tempering temperature on hardness, retained austenite and elastic limits of M-2 steel (F). 423-427 of M-2 steel (F). 424 of M-50 steel (F). 425 of M-50 steel (F). 426 of M-4 steel (F). 427 of M-50 steel (F). 428 Electron transmission microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 432-435, 439 of 410 stainless steel. 515, 518, 519 Electron transmission microscropy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscropy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscropy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscropy of martensitic C steel (A). 344-354 of 316 stainless steel. 516, 518 Electron transmission microscropy of martensitic C steel (A). 344-354 of 316 stainless steel. 310 sta		
Effect of stress decreases on creep of aluminum in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effective resolved shear stress as function of indent or orientation (F). 2327, 328 Elastic limit definition. 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 423-427 of M-2 steel (F). 424 of 440 C steel (F). 425 of M-4 steel (F). 426 of M-50 steel (F). 427 of M-50 steel (F). 428 effect of veryllium growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission microscopy of martensitic C steel (A). 610 stainless steel. 6110 stainless steel. 612 stainless steel. 613 stainless steel. 614 of 440 c steel (F). 6140 stainless steel. 615 stainless steel. 616 stainless steel. 617 stainless steel. 618 stainless steel. 619 stainless steel. 610 artensitic C steel (A). 610 attainless steel. 610 attainless steel. 610 artensitic C steel (A). 610 attainless steel. 610		
in the dislocation climb region (A). 111-115 Effect of surface finish on properties of beryllium sheet (A). 84-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). 591-597 Effective resolved shear stress as function of indent or orientation (F). 227 Effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 428 of M-2 steel (F). 429 of M-50 steel (F). 424 of 440 C steel (F). 425 cof 52100 steel (F). 426 dof 440 C steel (F). 427 of 440 C steel (F). 428 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission microscopy of martensitic C steel (A). 343-343 543 (d) stainless steel (A). 343-343 543 (d) stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 341-354 341 (d) stainless steel (A). 342-435, 439 of 410 stainless of teel. 342 (d) stainless steel. 342 (d) stainless steel. 343-435, 439 of alkali metals (T). 207 Elongation of medium-carbon steel, Al-killed (T) with additions of Cb. 8 of monel, influence of temperature and loading rate (F). 121-124 Elongation of Alfoestier. 149 Electron transmission microscopy of alkali metals (T). 207 Elongation of medium-carbon steel, Al-killed (T) with additions of Cb. 8 of monel, influence of temperature for Alrey. 150 (rational steel (F). 151 (rational steel (F).	type 4340 steel (A)	procedure
Effect of surface finish on properties of beryllium sheet (A). S4-95 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effective resolved shear stress as function of indent or orientation (F). Effective resolved shear stress as function of indent or orientation (F). Elastic limit definition. 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). of M-2 steel (F). of M-2 steel (F). of M-50 steel (F). of 2100 steel (F). of 2200 steel (F). of 10 stainless steel with tempering at various temperatures (F). for 10 stainless steel with tempering at various temperatures (F). Electrolytic iron effect of concurrent straining on annealing behavior (A). Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission micrographs illustrating dislocations, precipitation, grain growth, etc., in microstructure of numerous metals and alloys (Darken Address). 602-638 Electron transmission microsopy of martensitic C steel (A). 344-354 519 steles (F). 423-427 61 stainless steel. 41 stainless steel. 42 steles (F). 423 of 410 stainless steel. 41 stainless steel. 42 steles (F). 425 of martensitic C steel (A). 344-354 346 stainless steel. 43 lektron transmission microscopy of martensitic C steel (A). 344-354 349 of 410 stainless steel. Al-killed (T) with additions of Cb. additions of Cb.	Effect of stress decreases on creep of aluminum	Electron-probe analysis of 410 stainless steel
Effect of surface finish on properties of beryllium sheet (A). S49-5 Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A). Effective resolved shear stress as function of indent or orientation (F). Effective resolved shear stress as function of indent or orientation (F). Effective resolved shear stress as function of indent or orientation (F). Elastic limit definition. 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F). 423-427 of M-2 steel (F). 424 of 440 C steel (F). 425 of 52100 steel (F). 425 elastic modulus of vanadium (T). 153, 154 Electrical resistivity of 410 stainless steel with tempering at various temperatures (F). 516 Electrolytic extraction of carbides from steel. 209 Electrolytic iron effect of concurrent straining on annealing behavior (A). 331-343 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 432-425, 439 of 410 stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 432-435, 439 of 410 stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 516 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 515, 518, 519 Electron transmission microscopy of martensitic C steel (A). 344-354 of 316 stainless steel. 432-425 of alkali metals (T). 50 for dividual metals (T). 510 for monel, influence of temperature of provide martensitic C steel (A). 516 for alkali metals (T). 517 for monel, influence of temperature of provide martensitic C steel (A). 518 for alkali metals (T). 518 for alkali metals (T). 519 for monel, influence of	in the dislocation climb region (A)	515-517
sheet (A)	111-115	Electron transmission micrographs
sheet (A)	Effect of surface finish on properties of beryllium	illustrating dislocations, precipitation, grain
Effect of temperature exposure on the microstructure of 4.5Al-3.5Ti Nickel-base alloy (A)		
structure of 4.5Al-3.5Ti Nickel-base alloy (A)		
Effective resolved shear stress as function of indent or orientation (F) 327, 328 Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423 -427 of M-2 steel (F) 424 of 440 C steel (F) 425 elastic modulus of vanadium (T) 153, 154 Electrical resistivity of 410 stainless steel with tempering at various temperatures (F) 516 Electrolytic extraction of carbides from steel 209 Electrolytic iron effect of concurrent straining on annealing behavior (A) 331-343 Electron diffraction data on A 286 (T) 223		
Effective resolved shear stress as function of indent or orientation (F) 327, 328 Elastic limit		
indent or orientation (F) 327, 328 Elastic limit definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423-427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-50 steel (F) 425 of 52100 steel (F) 425 elastic modulus of vanadium (T) 153, 154 Electrolytic extraction of carbides from steel. Electrolytic iron effect of concurrent straining on annealing behavior (A) 331-343 Electron diffraction data on A 286 (T) 223 of 316 stainless steel 432-435, 439 of 410 stainless steel 515, 518, 519 Electronegativities of 410 stainless steel 516, 518, 519 Electronegativities of 410 stainless steel 516, 518, 519 Electronegativities of 418 stainless steel 516, 518, 519 Electronegativities of 410 stainless steel 515, 518, 519 Electronegativities of 410 stainless steel 516, 518, 519 Electronegativities of 410 stainless steel 516, 518, 519 Electronegativities of 410 stainless steel 516, 518, 519 Electronegativities of alkali metals (T) 207 Elongation of medium-carbon steel, Al-killed (T) with additions of Cb 8 of monel, influence of temperature and loading rate (F) 121 Elongation of 410 stainless steel 432-435, 439 of 410 stainless steel 516, 518, 519 Electronegativities of alki metals (T) 207 Electronegativities of alkali metals (T) 207 Electronegativities of alki metal		
Elastic limit definition		
definition 422 effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F) 423-427 of M-2 steel (F) 426 of M-4 steel (F) 427 of M-50 steel (F) 427 of 52100 steel (F) 423 related to strain gage data 425 Elastic modulus of vanadium (T) 153, 154 Electrical resistivity of 410 stainless steel with tempering at various temperatures (F) 516 Electrolytic extraction of carbides from steel effect of concurrent straining on annealing behavior (A) 331-343 Electron diffraction data on A 286 (T) 207 Electrolytic iron effect of alkali metals (T) 207 Electronegativities of alkali metals (T) 207 Elongation of medium-carbon steel, Al-killed (T) with additions of Cb 8 of monel, influence of temperature and loading rate (F) 121-124 Elongation at intermediate temperatures for brass, Ni-Cu and monel (T) 121 Elongation vs. temperature for Al (F) 118, 120 for Armeo iron (F) 119 for Cartridge brass (F) 118 for Ni (F) 119 for Muntz metal (F) 119 for stainless steel 18-8 (F) 119 for stainless steel 18-8 (F) 119 Embrittlement		
effect of tempering temperature on hardness, retained austenite and elastic limits for 5 steels (F)		
retained austenite and elastic limits for 5 steels (F)		
5 steels (F) 423-427 of M-2 steel (F) 426 of M-4 steel (F) 427 428-427 429 439 449 429		
of M-2 steel (F)		
of M-4 steel (F)		
of M-50 steel (F)		
of 440 C steel (F) 425 Elongation at intermediate temperatures for brass, Ni-Cu and monel (T) 121 related to strain gage data 425 Elongation at intermediate temperatures for brass, Ni-Cu and monel (T) 121 Elestic modulus of vanadium (T) 153, 154 Elongation vs. temperature Elongation vs. temperature of 410 stainless steel with tempering at various temperatures (F) 516 for Armeo iron (F) 118 Electrolytic extraction of carbides from steel 516 for cartridge brass (F) 118 Electrolytic iron effect of concurrent straining on annealing behavior (A) 331–343 for Ni (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement 120		
of 52100 steel (F)		
related to strain gage data. 425 Elongation vs. temperature Elastic modulus of vanadium (T) 153, 154 for Al (F) 118, 120 Electrical resistivity for Armeo iron (F) 119 of 410 stainless steel with tempering at various temperatures (F) for cartridge brass (F) 118 Electrolytic extraction of carbides from steel for Inconel (F) 119 Electrolytic iron effect of concurrent straining on annealing behavior (A) for Ni (F) 118 Electron diffraction data on A 286 (T) 331-343 for stainless steel 18-8 (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement		
Elastic modulus of vanadium (T) 153, 154 for Al (F) 118, 120		
The following district Fig. 209 For Muntz metal (F) 119		
of 410 stainless steel with tempering at various temperatures (F) for cartridge brass (F) 118 Electrolytic extraction of carbides from steel for Inconel (F) 119 Electrolytic iron 209 for Muntz metal (F) 118 effect of concurrent straining on annealing behavior (A) 331–343 for Stainless steel 18-8 (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement		for Al (F)
of 410 stainless steel with tempering at various temperatures (F) for cartridge brass (F) 118 Electrolytic extraction of carbides from steel for Inconel (F) 119 Electrolytic iron 209 for Muntz metal (F) 118 effect of concurrent straining on annealing behavior (A) 331–343 for Stainless steel 18-8 (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement	Electrical resistivity	for Armeo iron (F)
temperatures (F) 516 for copper (F) 118 Electrolytic extraction of carbides from steel for Inconel (F) 119 209 for monel (F) 119 Electrolytic iron for Muntz metal (F) 118 effect of concurrent straining on annealing behavior (A) for Ni (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement	of 410 stainless steel with tempering at various	for cartridge brass (F)
209 for monel (F) 119	temperatures (F)	for copper (F)
209 for monel (F) 119	Electrolytic extraction of carbides from steel	for Inconel (F)
Electrolytic iron		
effect of concurrent straining on annealing behavior (A) for Ni (F) 119 behavior (A) 331-343 for stainless steel 18-8 (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement 120	Electrolytic iron	
behavior (A) 331-343 for stainless steel 18-8 (F) 119 Electron diffraction data on A 286 (T) 223 Embrittlement 120		
Electron diffraction data for Ti (F)		
on A 286 (T)		
on martensitic C steel	on A 286 (T)	
	on martensitic C steel 350	

effect of testing and tempering temperatures	basic mechanisms in, for iron and steel
on (F)	299-321 curve for 410 steel, with and without ferrite
classification (F) 368, 371	(F)
in Ti-Al System	curve for 422 steel with delta ferrite (F)
Embrittlement test	463
for stainless steel	failure in bearing inner races 394 failure in Fe and steel under pulsating tension
in solid state	299–321
Endurance life	in rolling contact study 410
dependence on strain history (F) 183	of A 201 and A 302 steels 176-184
Endurance limit for Be sheet 92	of bearing inner races
Energy-well barriers in crystals 61, 62	of 12% Cr steel
Engineering stress-strain curve of 4340 steel effect of prestraining and retempering (F).	damping characteristics, microstructure and (A)
73-75	of pressure-vessel steels (F) 176–178
"Equi-cohesive temperature" 117	of 422 stainless steel, with and without
Equilibrum diagram for Y-Al system (F) 170 Equilibrium equipment	ferrite, unnotched and notched (F) (T) 45-48
argon gas cover 553, 554	Fatigue bonds in ferrite (F) (T)
assembled heating chamber (F) 552	302, 308, 309
disassembled heating unit (F) 553	Fatigue cracks in 4340 steel (F) 312, 318-320
lowering and turning mechanism (F)	Fatigue endurance limit of beryllium sheet 84, 90–92, 94
open and closed systems 551-553	Fatigue properties of 422 stainless steel, effect
pressure vessel with controls (F) 551	of delta ferrite
sampling	Fatigue stress
solidified melt (F)	effect on accelerating precipitation reactions
time for equilibration	in austenitic steel
x-ray examination	Fatigue tests effect of directionality
Ti and V	equipment
Etchant for temper brittleness 277-279	metallographic replicas during 301
Etching	FCC metals
of Be sheet	self-diffusion data (T) (F) 228, 229, 232
of carbides in 304 stainless steel (F) 367, 369, 370, 379	Ferric oxide direct reduction by solid C (A)129-142
Extraction replica analysis of 410 stainless	Ferrite
steel	in bearing inner race (F) 398, 399, 404
Extraction replica electron micrograph for 12%	in 422 stainless steel, effect of heat treatment
Cr steel after fatigue (F) 459, 461, 462	on
Extrusion	in 422 stainless steel, effect on properties
of Fe carbide by slip	(T)
Extrusion-intrusion mechanism in structure	(T)
changes of bearing inner races	single and bicrystals, fatigue (F) and slip
402-404, 410	in (F)
F	effect on properties (A)
	Ferrite stringers
Fabrication	in 422 stainless steel
effect on corrosion resistance of Zircaloy	effect on impact tests (T) 37, 38
2(A)	microstructure (F) 32, 33, 38, 40
of Ti-Mo-Pd alloys (T)	"weak link" phase
of vanadium	Ferritic grain structure in tempered martensitic
of Zircaloy-2-O alloys (F)	C steel
rolling, homogenization, etc.	diffusion and
Fasteners (8-8-1)	Fiber stress in creep specimens 512
high temperature instability 158-167	Field tests (corrosion resistance) of Ti and
Fatigue	Ti alloys in both oxidizing and reducing
at high and low strain amplitudes 299	media (T)
at high plastic strains (A) 176-184	Fission products

in LMFR, removal of	Fridman's universal theory of strength 569, 577, 578
Fissures	Fuel elements
grain boundary shearing and 126, 127 intergranular in Ni-Cu alloys under varied loading rates (F) 123, 124 nucleation and growth in monel 121–127	evaluation of fabrication techniques 262 microstructural changes during annealing (Ni-U) (F) 269
Flow curve	G
Flow stress	G
in Mg vs. shear strain (F) 54, 56, 59-61	Commo imp
Foreign atoms	Gamma iron brittleness range
in dislocation	
	in vacuum reduction
in strengthening	transformation to delta Fe 233, 235
Foreign atoms (zero-dimensional singularities) 601	Gamma prime agglomeration in Ni-4.5 Al-3.5 Ti alloy at 1900 F
Forging procedure for Zircaloy-2	Gases in vacuum reduction
effect on corrosion resistance (T) 248	composition changes at various temperatures
Formula for self-diffusion	(F)
development of	removal by trap line
Fracture	Germanium
cross section of 422 steel containing delta	solubility in liquid Bi (F) 192, 197, 199
ferrite (F) 40	Germanium-bismuth alloy
in bearing inner races, correlation with	microstructure (F)
structural changes	Gold-silver alloy
in Be sheet during tensile testing 88	dynamic annealing in
research in	Grain-boundary carbides in 304 stainless steel
Fracture stress in 4340 steel after prestraining	effect on intergranular corrosion (A). 362-380
and retempering 78	Grain boundary shearing
Fracture Toughness	fissures and
above proportional limit	in cartridge brass, under rapid loading
466, 472, 477-480	121, 122
below proportional limit	in creep behavior
466, 472, 473, 477, 478-480	in monel
effect of high test stresses 466, 467	in Ni-Cu, under rapid loading 121, 122
in high strength steel	Grain growth in medium-C steel, Al killed
effect of parameters on (A) 466-480	effect of Cb on (F)
in H-11 tool steel	Grain size
Fracture toughness test	effect on strength
equipment	in AZ61X mg alloy 543, 545
film reader	in low-C steel, effect of prior grain size, cold
IBM recording mechanism 470	reduction and annealing (F) 358-360
illustration of equipment (F) 469	in low-C steel, vs. cold reduction (F) 356
need of further research 479	in polycrystalline ferrite (T)
specimen and shape of cracks (F) 468	in 422 stainless steel, with and without
in 4330 M steel	ferrite, effect of austenitizing temperature
effect of initial crack preparation	34
472, 475, 476	Graphite
effect of nominal test stress level	effect of mg on, solubility in Fe-C system
472, 473, 477	(T)
effect of prestress472, 473, 477	in ductile cast iron (A)
effect of specimen width (F)	in vacuum reduction
469, 473, 475, 479	joint effects of mg and Si on solubility in
proportional limit and ultimate strength	in Fe-C system (T)
(F) 468, 472, 473	Graphite-sphere size
Fracturing of specimens	analysis of known distribution (T) 67
evaluation without use of a crack 477	calculated distribution (T)
in fracture toughness tests	continuous distribution (F)
Fragmentation of Fe carbide by development	distribution graph (F)
of intrusion(F)	distribution for 3 heats of ductile cast iron
Frequency distribution for 112-day corrosion	(T)70
of Zircaloy-2 (F)	effect of casting section size
Friction wear, dry	in ductile east iron
See Dry friction wear	Graphite susceptor
See Dry friction wear	Grapinte susceptor

in equilibrium equipment (F) 554	self-diffusion data (T) (F) 228, 229, 232
Graticule method 106	Heat-resisting alloys
"Gray lines" in bearing inner races (F). 399-401	de-boronization in 597
Greenspan-Irwin dimensional correction factor	process control 597
479, 480	Heat treatment
Griffith-Irwin test method for fracture toughness	of Armeo iron
equations for 472	effect on ductility vs. temperature (F)
schematic of specimen with yielding (F) 476	384-386
Gyroscopes, precision	of austenitic stainless steels 362
accuracy requirements 413	of AZ61X Mg alloy (T) 540, 543, 545, 546
	of medium-carbon steel
н	effect of Cb on 2, 3, 8
	of Ni-4.5 Al-3.5 Ti alloy
Hafnium-nickel system	effect on microstructure 591-597
See Ni-Hf system	of polycrystalline ferrite (T) 301
Hardness	of 304 stainless steel
effect of tempering on	of 316 stainless steels to effect creep behavior
for M-2 steel (F)	430-444
for M-4 steel (F)	of 5 steels in stress-strain study (T) 529
for M-50 steel (F)	of Ti-Al alloys
in 440 C steel (F)	of Ti-8Al-8Zr-1(Ta + Cb)
in 52100 steel (F)	of Zircaloy 2
effect of tempering temperature on, retained	effect on corrosion resistance (T) 248
austenite and elastic limits of 5 steels	effect on microstructure 254-258
(F)	Hertz contact loading
of bearing inner races vs. depth (F). 392, 393	in bearing inner races
of cold-rolled iron during static and dynamic	Hertz contact stresses
annealing	in bearing inner races (T) 391, 409
of columbium on various planes of crystal	Hexagonal metals
(F) (T)323, 325, 326	anisotropy of hardening in direct shear 59, 63
of columbium vs. reduction 155	Bauschinger effect
of Cr-Mo-V steel after varied heat treat-	c/a ratio in
ments	High-strength alloys
of medium-C steel, Al-killed	composition and mechanical properties (T)
how Cb affects8	446
of silicon ferrite (T)	effect of warm prestressing on notch properties
of 410 stainless steel with tempering at various	(A) 445-455
temperatures (F)	materials and procedure 446, 447
of 1040 steel wear pins during wear testing	High-temperature alloys
of 1040 steel wear pins during wear testing	comparative rupture strengths and com-
with tempering temperature (F) 280	positions (T)
of Ti-8Al-8Zr-1(Ta + Cb) (F) 159, 163-165	High-temperature alloys, specific types
effect of aging (F)	A-286
effect of cold work (F) 163, 164	composition (T)
of Ti-Mo-C alloys	
influence of aging (F)	notch sensitivity
of vanadium	220-226
influence of cold rolling (F) 155	specifications
	stress-rupture data (T)
vs. reduction	uses
	High temperature eroon in Al 111 115
of Cb (A)	High-temperature creep in Al 111–115
mathematical analysis	High-temperature properties
of textured polycrystalline metals 329, 330	of Fe-18 Ni-18 Cr
Hardness indentation	additive effect of alloying elements
stress and deformation during 326	526-538
Hardenability	High-temperature testing of Be sheet 88, 89
of 0.35-C steel	Homogenization heat treatment for Zircaloy 2,
effect of Cb on (F)	effect on corrosion resistance (T) 248
of medium-carbon steel, Al killed	Hot-cold working of metastable austenite,
effect of Cb on 4-7	definition
Hastelloy alloys	Hot fabricability of Zircaloy-2-oxygen alloys
corrosion resistance (F)	Het selling temperature for Zircelon 2
HCP metals	Hot rolling temperature for Zircaloy 2

effect on corrosion resistance (T) 248 Hot-work tool steels	Indium-bismuth system intermediate phases in
composition and microstructure of carbides	Indium-In Sb-In-Bi system
in (A)	constitution study 12-19
Hydrogen	idealized space model (F)
in Armeo iron	terminal binary systems and alloys (F) 10
effect of heat treatment on state of	vertical sections (F)
384, 385, 388	Inelastic behavior
in iron	low strain values in 413
noxious and innocuous states (A). 381-389	Influence of delta ferrite-carbide segregates on
introduction into sterile iron 383, 384	the properties of 12% chronium steel
Hydrogen embrittled iron	(A) 31-49
voids in	Influence of warm prestressing on the notch
Hydrogen embrittlement	properties of several high-strength alloys
in iron	(A)
Hydrogen evolution in stress corrosion cracking,	Ingot iron
sound effects	relationship between deformation annealing
Hydraulic machine yield point tests on V	temperature and grain size (F) 356
147, 148	Ingots
T.	effect of size and transverse properties on. 31
I	solidification in large (F) 31, 34, 48
	Ingots of Zircaloy 2
IBM recording mechanism 470	composition data (T)
Identification of phases in Ni-U diffusion zone	corrosion resistance (F)
(F)	hardness data (T)
Identity, concept of	Inhibitors in liquid metal reactor fuels
Impact energy	solubility of
of NMI hot-upset Be sheet (F) 93	Innocuous states of hydrogen in iron (A)
of 1040 steel, with tempering temperature	381-389
(F)	Instability in 8-8-1 fasteners at high temper-
Impact properties	atures
of medium-C steel, Al-killed	in hardened steel bearing inner races 390
effect of Cb on 8-11	in torsion tests, materials and treatment
of 422 stainless steel	(T)
effect of delta ferrite carbide	Interactions of imperfections 602-612
31, 33, 37-41, 48	Intergranular corrosion in stainless steel
Impact strength of vanadium 152-154	controlling factors 374, 375
Impact tests	Cr depletion
on Be sheets	effect of carbides on (A) 362-380
on 1040 steel	mechanism of (F)
Impact-transition temperature of medium-C	severity
steel, Al-killed, effect of Cb on 8-11	theories for
Imperfection	Intergranular cracking in stress corrosion
three approaches toward 601, 639	546-548
Imperfection interactions	corrosion current in (F)
mechanical behavior and 622-639	Intergranular fracture
Imperfections	minimum duetility and
arrangement of	Interlamellar spacing
elassification 601	by partial resolution method 109, 110
in solid metals	of pearlite (A)
interactions of	partial resolution method107-110
some observations on (A) 599	total resolution
Incipient melting of Y-Al system 169, 170	vs. frequency (F)
Inconel	vs. microscope resolving power (F)108, 109
corrosion resistance (F)	vs. numerical aperture (T)
elongation vs. temperature (F) 119	vs. pearlite temperature (F)
	Intermediate compounds
Indium solubility in lead (T)	of alkali metals and Bi
Indium-antimony-hismuth	of Ti-Al system
Indium-antimony-bismuth constitution studies (A) 12–19	of U and Bi
Indium ₂ bismuth	Intermediate phases
	in Ni-Hf system
lattice constants	crystal structure (T)

in Ni-Zr system	Iron ions
in Y-Al system 168, 169, 172, 173	diffusion into oxide lattice
Internal necking	129, 134–136, 141
Interstitial elements	Iron, polycrystalline
in vanadium	microplastic deformation curves (F)
effect on strength properties (F)145-148	302, 303
Interstitial locking of dislocations in 4340	strain gradient anneal
steel	Iron, single crystals
Interstitial or foreign atoms (zero-dimensional singularities)	strain-gradient-anneal
Investigation of notch sensitivity in A286 alloy (A)	equilibrium data for
ductility minimum in metals (A)	bility
117-128	effect of C, Si and temperature 560, 561
Iron	liquid-liquid equilibria (A)549-566
composition (T)	magnesium-rich layer
fatigue study using repeated tensile loading 299-321	Iron-chromium system phase diagram (F)
hydrogen embrittlement in	Iron-magnesium
noxious and innocuous states of H in (A)	diagram of closed and open systems (F) 551
381-389	Iron-18 Ni-18 Cr alloy
percentage in carbides with tempering tem- perature (F)	additive effects of alloying elements on mechanical properties at 1500 F (A)
percentage in carbides with austenitizing	526-538
temperature (F) 209-212	composition of experimental heats (T)527
preparation for pulsating tensile test	experimental procedure
300, 301	Iron-18 Ni-18 Cr, plus C, B and Mo
pulsating tension tests	ductility experiments533-538
repeated tensile loading (A)299-321	effect of minor additions on properties (T)
solubility in Mg-base liquid vs. temperature and C (F)	537 microbend experiments and crack propagation
effect of Si (F)	in (F)
solubility in Mg-rich phase (F)	microstructure (F)
549, 551, 562, 563	properties (T)
static stress strain hysteresis loops (F)	spheroidization (F)
304, 305	Iron oxide
Iron, alpha	change of crystal structure during reduction
See Alpha iron	(T)136, 138–141
Iron, Armeo	Iron-oxygen system
See Armco iron	phase diagram (F)
Iron—its alloys	Isochromal treatments of 410 stainless steel
brittleness ranges118	515
Iron-base melt containing Mg	Isothermal temperatures
microstructure (F)	of carbon steel
Iron, bierystals	correlation with pearlite spacing106
	Isothermal transformation
microplastic deformation curves (F) 302, 303	of lamellar pearlite to austenite
Iron, cold-rolled electrolytic	methods for measurement106-110
annealing behavior, with and without concur-	
rent straining (A)331-343	I
dynamic annealing	Jander equation (diffusion)135, 136
effect of annealing at several temperatures on hardness (F)	Joining by lead burning of Pb-Cd-Ni alloys
effect of annealing at several temperatures on	104, 105
microstructure (F)334, 335	Jones "gray lines" in bearing inner races
	399-401
hardness during static and dynamic an-	
nealing	K
material and behavior	
microstructure during static and dynamic	Kinetics of tempering
annealing	410 stainless steel

L	development of method551-560
Lamellar spacings by two-surface analyses	in Fe-C-Si-Mg system (A) 549-566
preparation of sample	review of literature
Laue photograms of Cb (F)324	Liquid-metal fuel constitutions III (A)
Lanthanum	185-201
solubility in liquid Bi (F) 186-188, 197	Liquid metal fuel constitutions IV (A)
Lattice constants of In ₂ Bi	201-207
Lead	Liquid metal fuel reactor185
analysis of high-purity	Liquidus of Zr-Ru-Bi system (F)199
melting and casting	Liquidus curves of Bi-fission product system (A)
solid solution hardening with four metals	185-207
(T)100	Lithium
Lead-base alloys alloy evaluation tests	effect on solubility of U in Bi (F)201, 202 Load
	effect on extent of stress affected zone in
dispersion alloying with eight metal powders.	bearing inner races (F)395, 396
dispersion hardening with Ni96-105	effect on rate of change in microstructure
solid-solution hardening with four metals	(F)
(T)99, 100	Load-elongation curve
solution hardening with Cd	for cold-worked and recrystallized V (F) 149
Lead-cadmium alloys	Opinsky's analysis
properties with Cd composition (T)100	to determine strain aging in V (F)150
Lead-calcium alloys	Loading rates in elongation
age hardening	for brass and Cu-Ni alloys (F)121
bend resistance (T)100	for monel (F)
creep resistance (T)100	Lord and Willis analysis
tensile properties (T)100	applied to ductile iron
Lead-Cd-Ni alloys	Low-alloy martensitic steel (300M)
bend resistance (T)101	effect of prestressing on notch properties
composition (T)	metarial and precedure 445–455
scale-up studies	material and procedure
tentative phase relationships for (F)102	yield-tensile strength ratio72
tensile properties (T)	Low-carbon steel
wrought, properties of (A)96-105	annealing, effect on magnetic properties
Lead-1Cd-0.2 Ni alloy	(F)
corrosion resistance (T)104	effect of grain size and C content on coercive
Lead-1.5 Cd-0.2 Ni alloy	force (F)
labrication	grain size
properties of commercial (T)104, 105	grain size-cold reduction (F)356
scale-up studies	material and processing355–358
Lead-2 Cd-0.2 Ni alloy	microstructure (F)
corrosion resistance (T)104	some processing factors affecting the magnetic
extruding, joining and rolling 104, 105	properties of (A)
Lead-2.3% Cd-0.18% Ni alloy microstructure (F)	Low-temperature brittleness
Lead-0.05 Cu alloy	in Armeo iron
corrosion resistance (T)104	Low-temperature testing
Lead-dispersion alloys	of Be sheet
cantilever-creep resistance (T)98	Lüders bands in deformation
Lead-0.23 Ni alloy	Lüders bands in deformation torsion shear bands like
solid solution hardening with 4 metals (T)	
100	M
Lead-nickel dispersion alloys	
microstructure (F)99	Macrostructure of H-11 tool steel (F)451
preparation	Magnesium
ength charges	difficulties in adding to Fe-base alloys
in 410 stainless steel with tempering at various	549-551
temperatures (F)	effect on graphite solubility (T)
imit method for measurement of pearlite	in Fe-base liquid
spacing	activity coefficient as affected by C (F) 564
determination of	joint effect with Si on graphite solubility
determination of	joint enece with the on graphice solubility

(T)564	in 302 stainless steel
solubility in Fe-base liquid549-561 effect of C and temperature (F)559, 560	in 304 stainless steel corrosion study (F)372, 373
effect of C, Si and temperature (F)	in 410 stainless steel, tempered (F)
effect of pressure	518-520, 522, 524
effect of time (F)	Martensitic steel
vapor pressure vs. temperature (F) 549, 550	effect of temper brittleness on dry friction
Magnesium alloys, ASTM types AZ 61X	wear (A)
composition (T)540	Mass, conservation of
grain size	ferrite (F)
metallography	Measurement of interlamellar spacing of pearlite
microstructure as received (F)542	(A)106-110
propagation of stress-corrosion cracking	Measurement of strain
(A)	Mechanical anisotropy in sheet materials
specimen holder (F)	482, 493–497, 502 Mechanical behavior
Magnesium ₁₇ Al ₁₂ in stress-corrosion cracking	imperfection interactions and 622–639
540, 543, 545, 547	in torsion
Magnesium alloy, special types	Mechanical-thermal treatments on 316 stainless
AM-C 57 SH	steel
stress corrosion cracking in 539, 540	effect on carbide precipitation433-435
J-1	effect on rupture life
stress-corrosion cracking	to affect creep behavior430-444 Mechanism
Magnesium-6Al-1 Zn alloy	of creep
stress-corrosion cracking	of intergranular corrosion
Magnesium-base alloys	in 304 stainless steel
stress corrosion cracking, explanations for	proposed
540	Medium-C steel, Al-killed
Magnesium-base melt containing Fe microstructure (F)	composition with Cb (T)
Magnesium, single crystals	hardenability
asterism after deformation	microstructure (F)
c/a ratio	preparation
flow stress in (F)	resistance to grain growth imparted by Cb
metallographic observations on slip56, 60	(F)3, 11
orientation (T)51	softening with increasing tempering tempera- ture and time (F)
preparation	tensile properties vs. additions of Cb (T)8
shear deformation (A)	Mehl partial resolution technique106, 107
stress on crystal planes	Melting
stress-strain curves, showing shift of strain	of Zircaloy-2 (F)20
direction (F)	effect on corrosion resistance (T)248
Magnetic aging of low-C steel (T)360	Melting temperature of pure metals (T)229
Magnetic properties of low-C steel effect of annealing and slow cooling (F)359	Mechanical properties changes in ferrite during fatigue tests (T)
effect of C content on (F)	302
effect of processing factors (A)355-361	microstructure and
factors which affect	of Be sheet
Magnetic susceptibility	effect of surface finish (A)84-95
method of test	of Fe-18 Ni-18 Cr alloy
of Ti-Al alloys (A)241-246	additive effect of alloying elements on, at
Magnetite in reduction of Fe ₂ O ₃ 139,141	1500 F
Managing Director's Report684-688	effects of elements added in combination
Manganese	529-533
solubility in liquid Bi	effects of elements added singly $527-529$
Martensite	of hardened and tempered 434072-83
embryos in 410 stainless steel (F)	of high-strength alloys (T)446
in 0.42 C steel, electron transmission micros-	of medium-C steel, Al-killed
eopy (F)	effect of Cb on
COP (*)	or omega pinese or it has another than

of 422 stainless steel containing delta ferrite (A)	in bearing inner races
of 300 M steel (T)446	fatigue failure and (F)
of B 120V CA Ti alloy (T)	in rolling contact study (F)410, 411
of Ti-Mo alloys containing noble metals (A)	Microstructural changes in hardened steel due to
286–298	rolling contact (A)
of Ti and Ti alloys	Microstructure
of H-11 tool steel (T)	
of unallowed remadium (A) 142 157	changes with annealing in Ni-U fuel elements
of unalloyed vanadium (A)143-157	schematic (F)
Metallographic observations	in bearing inner races (F)392, 393
during fatigue tests on iron and 4340 steel	changes due to rolling contact396, 397
306-319	in 12% Cr steels
on slip in Mg single crystals	after fatigue tests
Metallographic replicas during fatigue runs	damping characteristics and fatigue (A)
301	456-465
Metallography	delta ferrite in (F)
of Al-Ni-U bonds in nuclear fuel elements	mechanical properties and
(A)	of A 286 alloy (F)
of AZ61X	of Al-Ni diffusion zones (F)
of Sb-Bi-In system	of Armeo iron
of bearing inner races392, 393, 397-399	of AZ61X Mg alloy
of Be sheet	as received (F)
of diffusion couples	after heat treatment (F)
of ductile cast iron	
of equilibrium study (F)	of Ba-Bi alloy (F)
	of Be sheet, showing porosity (F)90
of fatigue tests on iron and 4340 steel	of carbide precipitation in 304 stainless steel
306-319	(F)363-369
of graphite size in ductile cast iron (A)	of carbides in Cr-Mo-V steel 208-219
65-71	of cartridge brass (F)121, 122
of Ni-Hf system	of cold-rolled iron during static and dynamic
of Ni-Zr system	annealing (F) 334, 335, 339, 340
of temper brittleness277-279	of columbium carbide (F)
of Ti-8Al-8Zr-1(Ta + Cb)	of Cr carbides in 304 stainless steel (F)
of wear test pins (F)	364, 365, 367, 372, 374, 376-378
of Y-Al system	of ductile cast iron (F)
of Zircaloy-2	of Fe-base melt containing Mg (F) 556, 557
Metallurgical evaluation of Zircaloy-2	of Fe-18Ni-18Cr alloy
256-258	effect of B, C, and Mo (F)530-534
Microbend specimen	of Ge-Bi alloy (F)
of Fe-18 Ni-18 Cr + C, B and Mo (F)536	of graphite spheres (F)
propagation of cracks (F)	of In-rich portion of Sb-Bi-In
Microconstituents, undesirable	of lead-nickel dispersion alloys (F)
in stainless steel forgings (F)	
The second secon	of low-C steel (F)
Microcracks	after quenching (T)
in alpha ferrite	of medium-C steel, Al-killed with and without
in fatigue tests	Cb (F)2
in polycrystalline ferrite (F)308, 311	of Mg-base melt (F)
in 4340 steel (F)299, 312, 318-320	of Ni-4.5 Al-3.5 Ti alloy
Microhardness of Ti-8Al-8Zr-1 (Ta + Cb) (F)	effect of 1700, 1800 and 1900 F exposure on
159, 163, 165	(A)
Microfissures in ferrite after reelectropolishing	optical (F)
(F)	of Ni-Cu alloys under slow and fast loading
Microplastic deformation curves	rates (F)121-123
for bierystals of iron (F)	of Ni-Hf system (F)
for polycrystalline iron (F)303, 304	of Ni-Zr system (F)
Microscope	of Pb-2.3% Cd-0.18% Ni (F) 103
objective aperture vs. interlamellar spacing	of Pd-Bi alloy (F)
(T)	of Phodium Di alloy (F)
resolving power vs. interlamellar spacing	of Rhodium-Bi alloy (F)
resolving power vs. internamenar spacing	of Sr-Bi alloy (F)
(F)106-108	of 316 stainless steel under various treatments
selection of right objective for pearlite spacing	(F)436, 437
study	of 410 stainless steel, with tempering (F)
Microscopic changes	516-523

of 422 stainless steel, containing delta ferrite	N
(F)	No-line in 4940 -t1
of 1040 steel, given impact tests (F)281	Necking in 4340 steel
of 4340 steel	determination of start (F)74-77, 82
effect of prestraining and retempering	in torsion testing
80-82	Negative strain effect with strain gages
of tempered martensite in C steel 345–353	414, 422
of Ti-8Al-8Zr-1 (Ta + Cb) (F) 159-166	Neodymium
of 60 Ti-killed steel in torsion zone (F) 572	solubility in liquid Bi (F)190, 197
of wear test pins (F)	New method for determination of liquid-liquid
of various Y-Al alloys (F)171-175	equilibria as applied to Fe-C-Si-Mg
of Y-Al system (F)171-175	system (A)
of Zircaloy-2 (F)254-256	Nickel
effect of heat treatment255-285	effect on lead-base alloys96-105
Molybdenum	elongation vs. temperature (F)119
effect on corrosion resistance of Ti in reducing	optimum range with Cd content in Pb-base
and oxidizing environments (F)	alloys100, 103
290, 292	Nickel and its alloys
effect on corrosion resistance of Ti-Mo al-	intermediate temperature brittleness118
loys	Nickel-4.5 Al-3.5 Ti alloy
effect on mechanical properties of Ti alloys	composition and procedure 591, 592
638	deboronization at 1900 F591-597
effect on 1500 F properties of Fe-18 Ni-18 Cr	effect of temperatures on microstructure
alloy (T)	(A)
effect on 1500 F properties of Fe-18 Ni-18 Cr	electron microscopy591, 592, 594–596
alloy with C and B (F) (T) 532-534	gamma prime agglomeration591-597
penetration of Ta into	heat treatment and microstructure591-597
calculation	phase study591, 592, 594, 595–597
percentage in carbides with austenitizing	service temperature study591-597
temperature (F)209-212	x-ray diffraction analysis (T)594
percentage in carbides with tempering tem-	Nickel-chromium steels, special types
perature (F)	A-286
solubility in liquid Bi 186, 197, 199	Notch sensitivity in (A)
Molybdenum-Pd	See also High-temperature alloys, specific types,
effect on corrosion resistance of Ti in reducing	A-286
oxidizing environments (F)290-292	Nickel-copper alloys (I and II)
Monel	composition and grain size (T)
composition and grain size (T)121	grain boundary shearing (F)122
compression stress vs. compression (F)568	microstructure (F)122
corrosion resistance (F)295	minimum ductility
3-dimensional graph of elongation with	tensile properties at intermediate tempera-
temperature and loading rate (F)124	tures (T)121
elongation vs. temperature (F)119	Ni-Cu alloys (70–30)
experimental method and results on minimum	intergranular fissures under slow and fast
duetility120-126	loading rates (F)123
micrographs of effect of temperature and	microstructure under slow and fast loading
loading rates (F)123-125	rates (F)
tensile properties at intermediate tempera-	Nickel-hafnium system
tures (T)	crystal structure of intermediate phases (T)
Morphology	589
of carbide precipitation in 304 stainless steel	microstructure (F)588
(F)363, 365–369, 374–376, 379	metallography
of carbides in tempering of 410 stainless	phase relationships in (A)587-590
	proposed phase diagram585-587
steel	Nickel-U diffusion couple or zone
of grain-boundary carbides in 304 stainless	diffusion zones (F)
steel (A)	effect of UO2 on microstructure (F) 271
of martensite in C steel	electron micrograph (F)264, 268, 269, 273
of phase changes in Ni-4.5 Al-3.5 Ti alloy	identification of phases (F) 260, 266, 267
591-597	improvement of bond strength274
Motion of relax ions in diffusion 237, 238	microstructure (F)261-263, 266, 271, 272
Muntz metal	x-ray diffraction (T)
elongation vs. temperature (F)118	Nickel-U fuel element
and the compensation (1) (1) (1) (1)	THE STATE OF THE S

electron micrographs (F) 264, 268, 269, 271, 273	in A-286 alloy (A)
microstructure changes with annealing, sche-	31-43, 44, 48
matic (F)	Notah sansitivity
structure-corrosion relationship 274, 275	Notch sensitivity in H-11 tool steel
structure-strength relationship274	in V at room temperature (F)149, 150, 156
Nickel-zirconium intermediate phases, crystal	Notch-tensile specimen
structures	center precracked (F)
Ni-zirconium	Notch-tensile strength at room temperature,
crystal structure	definition
Nickel-zirconium ₂	Notched-tensile tests on Be sheet 89, 90
crystal structure	Notch tests
Nickel 5-girconium	geometry of three specimens (F)448
crystal structure	prestressing of notched specimens447-452
Nickels-zirconium2	prestressing prior to notching
crystal structure	Noxious states of hydrogen in iron (A)
Nickely-zirconiuma	381-389
crystal structure	Nuclear fuel elements
Nickel ₁₀ -zirconium ₇	identification of diffusion zones in
crystal structure587	Nucleation and growth of fissures121, 122
solubility range (F)	Numerical aperture of a microscope 107
crystal structure587	and the same of a successful same of the s
Nickel ₁₁ -zirconium	0
crystal structures586	011 11 11 11
entectoidal decomposition (F)583-585	Objective of a microscope
Nickel-zirconium alloy	effect of its value in measurement107-110
temperature vs. resistance (F)585	vs. interlamellar spacing (T)
Nickel-zirconium system	Offset yield point, definition
alloy preparation	Offset yield strength, definition
crystal structure of intermediate phases	Open argon pressurized system
585-590	contamination by crucible
metallography	effect of pressure
microstructure (F)	in equilibrium study556-560
phase diagram (F)	raw materials
phase relationships in (A) 580-589	sampling
spectrographic analyses (T)581	time for equilibration
Nitrogen	Opinsky's analysis of load-elongation curve (steel)
effect on 1500 F properties of Fe-18 Ni-18 Cr	Optical strain gages
alloy (T)	Orientation 414
in cold-worked steel	fissure nucleation and growth and 127
equilibration technique	of Mg, single crystal (T)
in reduction	of Zn, single crystal (T)
Noble-metal fission products in Bi	Oxide formation in Ni-U fuel elements during
effect of Zr on solubility (T)192, 199	annealing (F)
Noble metals	Oxide phase in Ni-U zone
effect on corrosion resistance of Ti and Ti-Mo	effect on quality of bond275
alloys (T)	Oxide stringers in 422 stainless steel ingots
Notch geometry	(F)33
effect of prestressing on (F)447, 448	Oxidizing media corrosion resistance tests288
in 422 stainless steel with ferrite 40	Oxygen
plastic flow and	effect on properties of Zircaloy-2 (A)20-30
test specimens (F)	effect on properties of Zr20
Notch properties	chect on projecties of 21.
mechanisms for improvement by warm pre-	p
stressing	The state of the s
of H-11 tool steel	Palladium
effect of prestressing on (F) 449, 450	effect on corrosion resistance of Ti and its
of high-strength alloys	alloys286, 287
effect of warm prestressing (A) 445-455	effect on corrosion resistance of Ti-Mo al-
Notch sensitivity	loys
definition42	solubility in liquid Bi (F)
duetility and	Palladium-bismuth alloy
effect of warm prestressing454	microstructure (F)187, 192, 198

Palladium elements	Plastic flow constants
solubility in Bi (F)	for 24 S aluminum alloy (T)
Partial resolution method	for copper (T)
for interlamellar spacing107-110	for several carbon steels (T)153
formula107	for vanadium, annealed and cold-worked
pearlite spacing by	(T)
Particle-size distribution	Plastic flow (shear stresses) in bearing inner races
Cahn and Fullman	in bearing inner races
Particle strengthening	Plastic flow in high-strength materials. 481, 482
Pearlite, interlamellar spacing (A)106-110	effect of directional properties
Phase analysis of Ti-Al system	in steels at high strength levels
Phase boundaries in Ti-Al system (T)244	Plastic strain
Phase diagram	See Tensile creep resistance
liquidus temperature method581, 582	Plastic stress-strain curves for ball bearing
of Fe-Cr system (F)464	alloys
of Fe-O system (F)	Platinum
of Ni-Hf system, proposed	effect on corrosion resistance of Ti and its
of Ni-Zr system (F)	alloys
of Ti-Al system (F)	Polygonization and recrystallization during
of Y-Al system (F)	concurrent straining and annealing 332
	Polygonization with softening in cold-worked
Phase indentification in diffusion couples, by x-ray examination	iron
265	in static annealing of cold-rolled iron 333, 336, 337, 340, 341
Phase relationships	Porosity in Be sheet (F)90
in Ni-Hf system (A)	Potassium
in Ni-Zr system (A)	effect on solubility of U in Bi (F)202, 205
in Pb-Cd-Ni alloys (F)	Praeseodymium
Phase-rule analysis	solubility in liquid Bi (F) 189, 192, 197
mathematical formula553-555	Precipitate in delta ferrite
Phase study	in 12% Cr steel, after fatigue tests (F)
of Ni-4.5 Al-3.5 Ti alloy 591, 592, 594-597	458, 459, 462, 463
of Sb-Bi-In system	electron micrograph (F)462
of Ti-8Al-8Zr-1(Ta + Cb)159-162	x-ray diffraction and electron probe analysis
Physical properties of 410 stainless steels with	(T)463
tempering (F)	in 422 steel (F)
Picric acid-ether Zephiran etchant277-279	Precipitates in A-286
Pinhole corrosion tests	possible cause of notch sensitivity220-226
of Al-Ni-U bonds262	precipitation diagram of 304 stainless steel
of diffusion couples	(F)378, 379
Pitting	Prediction of atomic mobility in metallic
in bearing inner races 405, 406	systems227-240
in 304 stainless steel (F)374	Preferred orientation in V, both annealed and
Plastic behavior	cold-worked (T)
elastic limit and hardness with	Preparation of lead dispersion alloys98, 99
Plastic brittleness	Presidential Address
Plastic deformation	Pressure vessel in equilibrium equipment (F)
dislocation groups and 623-639	551, 554
effect on mechanical properties of iron and	Pressure-vessel steels
steel	See Steels for pressure vessels
in high-strength materials	Prestraining
in stress affected zone of inner bearing race 397	of high-strength alloys447
of microstructure of bearing inner races 404	of 316 stainless steel, carbide precipitation
of rolled surfaces (steel)	with430
	Prestraining and heat treatment
of strain-aged iron effect on mechanical properties	of 316 stainless steel
understanding of	effect on properties and carbide precipita-
unit, the dislocation 602	tion433-443
Plastic elongation to maximum load in 4340	Prestraining and retempering
steel	of 4325 steel
Plastic fatigue in pressure-vessel steels	of 4340 steel (A)72-83
176–184	practical limitations82

Prestressing	experimental methods
effect on mechanical properties in steel 467	recent studies of direct
of high-strength alloys	theoretical vs. practical (F)140
effect on notch geometry (F) 447, 448	See also Vacuum reduction
of notched specimens	Relationship between fatigue and damping
prior to notching	characteristics and microstructure in 12%
of 4330M steel	Cr steel (A)
effect on mechanical properties and fracture	Repeated tensile loading of iron and steel (A)
toughness (F)	299-321
of H-11 tool steel prior to notching (F)	Replica technique of slip
452, 453	applied to fatigue tests on iron and 4340 steel
Process control of heat-resisting alloys597	(F)
Propagation of stress-corrosion cracking in an	Reproducibility
Mg-base alloy as determined by several	of sampling in equilibrium study556, 557
techniques (A)539-548	of stress-strain curves of Mg 51, 58, 63
Properties of turbine blade steel	Residual stresses
Proportional limit on fracture toughness graph	in bearing inner races
of 4330M steel (F)	in Be sheet (F)
Pull/release type of cyclic loading on iron and	in roller specimens (F)
steel (A)	in steel, effect on plastic behavior428
Pulsating tension tests	Residual stress changes in bearing inner races
ruisiting tension tests	390-412
equipment	
on nardened and tempered 4540 steel	correlation of methods of measurement (F) 405
on single crystal and polycrystalline ferrite 299-321	development at loads above threshold stress 411
299-321	effect of contact stress magnitude (F) 409
Q	effect of fewer cycles (F)
Quantitative metallographic analysis of graphite	effect of operating time and stress (F)
	405, 406
size in ductile cast iron (A)65-71	effect of rolling contact
	measurement of
R	research approach
	Residual stress changes in hardened steel due to
Dans carth metals	Him (A) 200 410
Rare earth metals	rolling contact (A)
microstructures (F)187, 198	Resolution methods for interlamellar spacing
microstructures (F)	Resolution methods for interlamellar spacing 106–110
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages414
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages 414 Resolved shear stress in BCC crystals (F) 329
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages 414 Resolved shear stress in BCC crystals (F) 329 Resolving power of a microscope 106, 107, 110 Retained austenite content
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106-110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages
microstructures (F)	Resolution methods for interlamellar spacing 106–110 Resolution with various strain gages

in hardened steel changes in microstructure, hardness and residual stress in (A)	in steels
Roller specimens	Shear stress in Mg
contact stresses (F)	eycling experiments
effect on solubility of U in Bi (F) 202, 203, 205	increase with shifts of strain direction (F) 54, 55, 63
Rupture life of 316 stainless steel	of single crystals at 70 F (T) 52
correlation with ereep rate 442 , 443 effect of treatments on (F) $441-443$	Shear testing apparatus
Rupture strength for four high-temperature	compositions (T)
alloys (T)	materials and gages (T)
for Fe-18 Ni-18 Cr plus C, B and Mo	mechanical anisotropy 482, 493-497, 502
effect of spheroidization on (F) 536–538 Ruthenium	strain-hardening properties (A) 481–503 Sheet steel
solubility in liquid Bi (F) 187, 188, 194, 197	See Steel sheet
solubility in Bi-Rh (F)	Shock wave in stress corrosion 546 Silicon
•	effect on solubility of Mg in Fe and Fe in
S	Mg
Samarium	(T)
solubility in Bi-Ce (F)	Silicon ferrite hardness variation (T)
Sampling (in equilibrium study)	Silver
reproducibility of	aluminum-oxygen clusters in 612–616 Slip
Scale-up studies on Pb-Cd-Ni alloys 104, 105	in Be sheet
"Scalloping" in cold rolling of sheet 322 Scatter band of rupture for 422 stainless steel	in Cb during hardness tests
(F)	in Mg single crystals
Screw-type machine yield point tests on V 148, 149	active and latent 63 basal and nonbasal 57, 62, 63
Secondary hardening in Cr-Mo-V steels 208, 217-219	metallography
Secretary's Report	stress on crystal planes 56, 57
Segregation in Pb-Cd-Ni alloys 103, 104 Self-diffusion	Slip bands in bearing inner races, fine slip in (F)
correlation between experimental and cal- culated D (F) 231-233, 236	in polycyrstalline iron during fatigue test
effect of dilute alloying (F) 234	(F)
in alloy systems	Sodium effect on solubility of U in Bi (F) 202–204
in pure metals (T) (F) 227, 228, 229	Softening behavior of cold-rolled iron
prediction of activation energy for 236 rate of atoms formula with examples	by polygonization and recystallization 333-336, 340, 341
227-235	effect of concurrent straining at 2 tempera-
Sensitizing heat treatments for 304 stainless steel (F) 362, 363, 369–380	tures (F)
Service temperatures	Solid solution alloying of lead-base alloys with
effect on microstructure of Ni-4.5 Al-3.5 Ti alloy (A)	four metals (T)
Shear band geometry for sheet materials in plastic flow 484	Solid-solution hardening of Pb-Cd-Ni alloys 96-105
for steels	Solid solution strengthening 632, 633 Solubility
Shear deformation	of fission products in liquid Bi 185-207
by slip, glide, rotation, etc 576, 577 effect of aging	of Mg in Fe-rich phase effect of C, pressure and time (F). 558-560

of Sb, Cd, In, and Sn in Pb (T) 99 Some observations on atoms and imperfections	morphology of grain-boundary carbides (A)
(A) 599	pitting in (F)
Some parameters affecting measured fracture	precipitation diagram (F) 378, 379
toughness of high-strength steel (A)	stabilization by heat treatment (T)
466-480	376-379
Sound detection of stress corrosion cracking	Strauss corrosion tests
equipment	365-371, 374, 376, 379
of H evolution	316
of transgranular cracking 544	corrosion resistance (F)
S-N curves	creep behavior as affected by carbides (A)
for Be sheet (F)	430-444
for 422 steel, with and without ferrite (F) 45	electron micrographs of creep study (F)
Space diagram of elongation in monel (F) 124	432-435, 439
Space model of In-In Sb-In Bi 16	heat treatment to control microstructure
Specific volume in reduction of ferric oxide (T)	and creep
136, 138–141	material and creep test procedures 431
Specimen width in fracture toughness testing of 4330 M steel (F)	rupture life with various treatments (F)
Sphere size distribution	410 441, 442
chord-length data (F)	carbide studies
for 3 heats of ductile cast iron (T) 70	compositions (T)
Spheroidizing heat treatment of Fa-18Ni-18	corrosion resistance
Spheroidizing heat treatment of Fe-18Ni-18 Cr + C, B, & Mo (F) 534-538	Cr depletion theory of corrosion . 520, 524
Spinel layer in iron	electrical resistivity with tempering (F)
Stabilization by heat treatment of 304 stainless	516
steel (T)	hardness with tempering (F) 516
Stable elongation of 4340 steel 77, 78, 82	length changes with tempering (F) 516
definition	microstructure
Stainless steel	physical properties 515, 516
Cr impoverishment theory in intergranular	submicroscopic structures in tempering (A)
corrosion	514-525
embrittlement test 365, 366	410, martensitic
Stainless steel, austenitic	fatigue, damping characteristics and micro-
creep behavior as effected by carbides (A)	structure (A) 456-465
430-444	materials and procedure 456
Stainless steel forgings	rotating cantilever beam fatigue tests
tensile properties (T)	456, 457
undesirable microconstituents (F) 35	422
Stainless steel ingots	influence of delta ferrite-carbide segregates
effect of size and solidification segregation	on properties (A)
(F)	relationship between fatigue, damping
Stainless steel, specific types	characteristics and microstructure (A)
18-8	456-465
elongation vs. temperature (F) 119	422, with delta ferrite anisotropy in
301 sheet	
composition and gage (T)	fatigue curves (F)
ties (F) 490, 491, 501	notch sensitivity (F) 40, 43, 44
plastic flow analysis	S-N curves (F)
strain hardening	stress rupture tests (F)
tempers studied (T)	tensile, fatigue and impact properties (T)
302	33, 44
carbide precipitation in corrosion tests	422, without delta ferrrite
373	master rupture curve (F) 42
304	S-N curves (F) 45, 46
bend tests 370, 371	structural instability 40
carbide precipitation 364-369	431. martensitic
corrosion resistance (F)	effect of delta ferrite
corrosion tests	Static annealing,
etching 369, 370	definition
intergranular corrosion (A) 362-380	of cold-rolled electrolytic iron 333
martensite in corrosion study (F). 372, 373	microstructure and (F)
	-

tests 332, 333	(T) 569
Static properties of Be sheet. 84, 88, 91, 94	torsion testing 573
Static stress strain hysteresis loops	1213
for iron (F)	hardness and treatment for torsion test
for 4340 steel (F)	(T)
Steel	torsion testing 573
fatigue study using repeated tensile loading	4325
(A)	effect of prestraining and retempering
nitrogen in	79, 82
voids in	4330
Steel ball bearing inner races	parameters affecting fracture toughness (A)
rolling contact study 390-412	466-480
study of stress changes	4330M
See also Bearing inner races	effect of specimen width on fracture tough-
Steel for pressure vessels	ness (F)
cumulative fatigue at high plastic strains 176-184	material and fabrication procedure 467-469
	prestressing, effect on properties (F)
damage-cycle ratio diagram (F) 178-183	prestressing, enect on properties (F)
strain deflection hysteresis (F) 177, 179	4340
tensile properties (F)177, 178	
Steel forgings, large	analysis and heat treatment
effect of carbides on fatigue and tensile	composition (T) 300, 301
properties 48, 49	effect of prestraining and retempering
Steel, hard, heat-treated	on properties (A)
torsion studies on	electron micrographs (F) 80-82
Steel, hardened	fatigue tests
microstructural and residual charges in, due	hardness and treatment for torsion test
to rolling contact (A) 390-412	(T)
Steel, high-strength	mechanical properties after prestraining
parameters which affect fracture toughness	and retempering
in (A)	microstructure (F)
Steel sheet	pulsating tension tests on hardened and
composition and gage (T)	tempered
strain hardening properties 481-503	repeated tensile loading (A) 299-321
test procedure	static stress strain hysteresis loops (F)
Steel, 60 Ti-killed	306, 307
grain structure in torsion zone (F) 572	stress-strain curve (F)
hardness and treatment for torsion test	tensile properties after thermal-mechanical
(T)	properties
Steels AISI-SAE types	torsion testing (F) 572-574, 577
1018	torque-twist record (F) 576 52100
hardness and treatment for torsion test	
(T)	effect of tempering on hardness, retained
torsion testing	austenite and elastic limit (F) 423
1035, Al-killed	electron microscopy under rolling contact
effect of Cb on properties 1–11	(F) 397–403, 411
1040	heat treatment (T)
coefficient of friction	microstructural and residual stress changes
effect of temper brittleness on dry friction	in, due to rolling contact (A) 390-412
wear (A)	Steels, AMS types
hardness in wear tests 278, 279, 282	5547
hardness vs. tempering temperature (F)	composition and gage (T) 483
280	heat treatment and tempering (T) 484
impact energy vs. tempering temperature	plastic flow analysis 481–504
(F)	test procedure (T)
microstructure of impact specimens (F) 281	true stress-strain curves (F). 489, 491, 500 5548 sheet
properties and wear rate transition	composition and gage (T) 483
276, 277	effect of aging on strain hardening
wear rate transition	487, 491
wear rate vs. load (F)	heat treatment and tempering (T) 484
1113	plastic flow analysis 481-504
hardness and treatment for torsion test	test procedure (T) 483, 484

true stress-strain properties at various temperatures (F)	by lessening of distances between particles 629
488, 489, 494, 497-499	by refinement of grains
Steel, ASTM series	by small particles
A-201, fatigue study	by solid solution
A-302, fatigue study 176-184	by work
Steels, specific types	Stress
AMS 6427	deformation and, during hardness indenta-
fracture toughness in	tion
See also 4330M steel	effect of decreases on creep of Al in disloca-
300M, low-alloy martensitic	tion climb region (A) 111-115
composition and mechanical properties (T)	"Stress-affected zones" in bearing inner races
466	microstructural changes in 390-412
effect of prestressing on notch properties	of 52100 steel in rolling contact 390-412
445-455	residual stress changes in 390-412
0.09C Thomas	Stress corrosion
compression stress vs. compression (F)	definition
568	Stress corrosion
"Sterile" iron	intergranular and transgranular cracking and
Strain	539
degree of, in instruments	
	Stress corrosion cracking
deflection hysteresis curve for longitudinal	apparatus and experimental procedure
(F)	540-542
measurement systems 178, 413–418	constant deflection technique 545
symbols for (T)	effect of acidity of solution
Strain aging in 4340 steel	in AM-C 57 SH 539, 540
	in AZ61X Mg alloy
in vanadium 145, 146, 149, 150, 156	in J-1 Mg alloy
Strain-deflection hysteresis in pressure-vessel	mechanisms of
steel (F) 177, 179	sound detection in
Strain gages capacitance-schematic (F)	specimen holder and preparation (F)
comparison of equipment and results. 422	540, 541
	stressing techniques
negative effects	Stress-crack curve for 4330M steel (F). 468, 471
Strain gradient-anneal technique for single	Stress-crack relationships in fracture toughness
and polycrystals of iron 301	477-479
Strain hardening exponent for steel sheet (T)	Stress-induced migration of C atoms in structure
	changes of bearing inner races 403
for Ti alloy sheets (T)	Stress-induced ordering of C atoms in 4340
for V (T)	steel
measurement	Stress parameter K in fracture toughness. 478
negative values	for H-11 tool steel (F) 450, 451
Strain hardening in single crystals	Stress pattern in torsion bar (F) 418
effect of dislocations on 60, 61	Stress-rupture properties
in Mg 51-54, 63	of A-286 alloy (T)
in zine	of Fe-18Ni-18Cr alloy at 1500 F 526-538
Strain hardening properties	of 422 stainless steel with ferrite (T) (F)
agreement between shear and tension rate	31, 41-44, 48, 49
63	Stress-strain curves
of high-strength sheet materials (A). 481-503	for magnesium, single crystals (F) 50-64
of pressure-vessel steels	for sheet materials 481-503
power law	Stress-strain curves
Strain range (steel)	for M50 steel by tension and torsion tests
change with cycling (F)	(F) 421, 422
change with deflection (F)	for 4340 steel, effect of prestraining and re-
Strain reversal	tempering
effect on stress-strain curves 50	for zine, single crystals
Strauss corrosion tests on 304 stainless steel	tension and torsion tests for
Strength tests on 304 stainless steel 365-371, 374, 376, 379	tension not applicable to torsion or compres-
	sion
effect of grain size on	
Strengthening	Stringers
by alloying	in bearing inner races (F) 399, 400

in 422 steel ingots (F)	effect on hardness, retained austenite and elastic limits of 5 steels (F) 423-427
Strontium	effect on weight and composition of carbides
solubility in liquid Bi (F) 186, 187, 192, 197	in Cr-Mo-V steel
Strontium-bismuth alloy	Tensile creep resistance of commercial Pb-1.5Cd-0.2Ni (T) 104
microstructure (F)	
ferrite	of Pb-Cd alloys (T)
Structure-corrosion relationship	Tensile creep tests
effect of oxide phase on 274, 275	on Pb-base alloys
in Al-Ni-U bond	Tensile properties
Structure-strength relationship in Ni-U bonds	of Be sheet (T) (F) 85, 88, 89
274	of medium-C steel, Al-killed effect of Cb
Surface defects in Be sheet 84, 90-94	on (T)
Surface irregularities in wear testing. 277, 284	of Pb and Pb-0.23 Ni alloys with 4 additional
Surface finish in Be sheet	metals (T) 98, 100
effect on properties (A) 84–95	of Pb-Cd alloys
Subgrain structure in monel 124-126	of Pb-Cd-Ni alloys (F) 101, 103, 104
Submicroscopic structures in tempering 410	of pressure-vessel steels (T) 177, 178
stainless steel (A)	of 422 stainless steel, effect of delta ferrite-
Substructure in aluminum	carbide
effect of stress on creep rate 111–115 Sub-ternary diagram	pering
of In-In Sb-In-Bi	of 4340 steel
Sulphide stringers in 422 steel ingots 33, 35	effect of prestraining, pretempering and
Symbols	retempering (F)
for strain measurement (T) 428	of Ti and Ti alloys (T)
	of Ti-Mo-C alloys (T)
T	of Ti-Mo-Pd alloys (T) 295-296
Tantalum	of vanadium (F) 144, 145, 147, 149, 150
corrosion resistance (F)	Tensile tests
penetration into Mo calculation 233	on Be sheet
Technetium	dimensions of test specimens (F) 87
solubility in liquid Bi	on vanadium
Technical Program at 43rd Annual Convention 659-664	1 ension-tension latigue properties of Be sneet 91, 92
Temperature reduction degree curves (F)	Tension test for stress-strain curves. 414-416
132-139, 141	results
Temperature variation in centrifugal creep	test specimen (F)
tests on Al	Ternary diagram of Sb-Bi-In 16, 17
Temper brittleness	Test stress level
definition	effect on fracture toughness of 4330M steel
impact testing and metallography reveal	(F)
277, 278	Texture in a polycrystalline metal
in martensitic steel, effect on dry friction	hardness anisotropy in 329, 330
wear (A)	Thallium HCP to PCC 1 1 1
in medium-C steel, containing columbium	transformation HCP to BCC calculation
in plain-C steel	Thomas analysis
in 1040 steel, relation to wear 284	Thermal analysis of In-rich portion of Sb-Bi-In 13, 16
metallographic procedure	Thermal neutron capture cross-section
Tempering	of Y-Al alloys
of 0.42% carbon steel	Thermobalance in vacuum reduction (F)
electron microstructure and (F). 344-353	130, 132
of medium-C steel, Al-killed	Thermodynamic calculations of interaction
effect of Cb on 5-7, 11	parameters between liquid metals
of 410 stainless steel, submicroscopic struc-	559, 562-565
tures in (A)	Threshold stress
Tempering action in rolling contact tests (F)	in rolling contact tests on bearing inner
397, 398, 401, 404	races 395–397, 408–411
Tempering kinetics of 410 stainless steels	Tin
Tempering temperatures 516-522	in Zircaloy-2, effect on corrosion behavior 257, 258
rempering temperatures	201, 200

solubility in lead (T)	Titanium-Mo alloys, containing noble metals
Tin bronze, 95/5	corrosion resistance (A) 286-298
hardness and treatment for torsion test (T)	mechanical properties (A) 286-298
569	preparation (T)
local shear bands in torsion (F) 571, 572	Titanium-Mo-C alloys
Titanium	influence of aging on hardness (F) 297
corrosion resistance (F) 286–289, 295	tensile properties, with and without Pd
effect of Mo and Mo-Pd on corrosion resist-	(T)
ance in both reducing and oxidizing	Titanium-Mo-Pd alloy
environments (F)	corrosion resistance and mechanical properties
effect of Pd on corrosion resistance	286-298
286, 288, 289	tensile properties (T)
effect on 1500 F properties of Fe-18Ni-18	Titanium-noble metal alloy
Cr alloy (T)	corrosion resistance (F)
elongation vs. temperature for refined and	man i a a a a a a a a a a a a a a a a a a
commercial (F)	Titanium-0.2% Pd alloy tensile properties (T)
Erichsen tests on annealed and cold-worked	Titanium sheet
155	compositions and gages (T)
minimum ductility near 500°	mechanical anisotropy values (T) 499, 502
tensile properties (T)	plastic flow analysis
Titanium alloys	strain hardening exponent vs. true strain
corrosion resistance in reducing environ-	(F)
ments 286, 287	tension properties (T)
effect of Pd on corrosion resistance 286	test procedure
Titanium alloy sheets	true stress-strain curves (F)
compositions (6) and gages (T) 483	Tool steels for bearings, comparison of 423-428
mechanical anisotropy values (T) 499, 502	Tool steels, specific types
plastic flow analysis	440 C
strain hardening exponent vs. true strain	effect of tempering on hardness, retained
(F)	austenite and elastic limit (F) 425
tension properties (T) 491	heat treatments (T)
test procedure	H-11
true stress-strain curves (F) 486, 491	composition and mechanical properties
Titanium alloy, special types	(T) 446, 483
B120VCA	effect of prestressing on notch properties
composition and mechanical properties (T)	445-455
446	fracture toughness
effect of prestressing on notch properties	macrostructure (F)
445-455	materials and procedure 446, 447
materials, and procedure 446, 447	notch properties with prestressing (F)
Titanium-aluminum alloys	449, 450
embrittlement in	notch sensitivity
heat treatment	stress intensity factor K (F) 450, 451
intermediate compounds in	warm prestressing and notch properties
magnetic susceptibility (A) 241–246	454, 455
preparation	H-11 sheet
Titanium-aluminum system	composition and gage (T)
phase analysis	heat treatment and tempering (T) 484
phase diagram (partial)	plastic flow analysis
Titamium ₂ Al and Ti ₂ Al/Ti ₂ Al	strain hardening properties with tem-
phase boundaries (T)	perature 486, 488
Titanium-8Al-8Zr-1(Ta + Cb)	test procedure (T) 483, 484
cold work (F) 159, 163, 164	true stress-strain curves (F) 485, 487
constitution and transformation behavior	true stress-strain properties vs. tempering
(A)	temperatures (F)
hardness (F) 159, 163, 165	M_2
heat treatment	effect of tempering on hardness, retained
microstructure and x-ray analysis (F)	austenite and elastic limit (F) 426
159-164, 166	heat treatment (T) 429
Titanium-Mo alloys	M ₄
corrosion resistance (F) 286, 287, 293, 295	effect of tempering on hardness, retained
effect of heat treatment on properties. 297	austenite and elastic limit (F) 427
properties of omega phase	heat treatment (T) 429
brokering or ourself broker treet treet and	1-/

M-50	Turbine blade steel
comparison of stress-strain curves by dif-	properties 43
ferent gages (F)	secondary phases and inclusions in 43
M-50	Turbine components of 422 stainless steel 31
effect of tempering on hardness, retained	Two-surface analysis, pearlite spacings by
austenite and elastic limit (F) 424	106, 107
heat treatments (T)	
stress-strain curves (F) 421	U
Torque-twist records	Ultimate strength of 4330M steel 468
of cold drawn metals (F) 575	on fracture toughness curve (F) 472, 473
of heat-treated 4340 steel (F) 576	Uranium
Torsion	activation energy for self-diffusion . 235, 236
of Armeo iron, shear bands (F) 571	effect of alkali metals on solubility in Bi (A)
of $70/30$ brass, shear bands $(F) \dots 571$	201–207
of cold-drawn tin bronze (F) 571	Uranium-bismuth liquidus
Torsional ductility in strong steels 577, 578	effects of alkali metals on (A) 201–207
Torsion bar	Uranium-Bi-Zi
stress patterns in (F)	
Torsion shear bands in numerous alloys (F)	effect of Ce, Ba + Pd fission products on
571-575	liquidus
Torsion straining equipment 570	Uranium-Cs-Bs system
Torsion testing	effect of Cs on solubility of U in Bi
Bauschinger effect (F) 571, 572, 574	203, 204, 206 Uranium-K-Bi system
diffuse bands	
localized bands in 570, 571	effect of K on solubility of U in Bi (F)
necking in	Usanium Li Bi sustam
on hard-drawn wire 577, 578	Uranium-Li-Bi system
shear features 574, 575	effect of Li on solubility of U in Bi (F)
strain-hardening exponent 568, 569	201, 202
stress-strain relations 575, 576	Uranium-Na-Bi system
Torsion testing (stress-strain)	effect of Na on solubility of U in Bi (F)
illustration (F) 417	Userium anida formation during applica
loading cycle in (F)	Uranium oxide formation during annealing
mathematical analysis	266-274
stress patterns in bar (F)	Uranium-Rb-Bi system
test specimen (F)	effect of Rb on solubility of U in Bi
Total resolution method for interlamellar spacing	202, 203, 205
106, 107	v
Toughness in 4340 steel after prestraining and	· · · · · · · · · · · · · · · · · · ·
retempering 79	Vacancies
Transformation behavior of Ti-8 Al-8 Zr-1 (Ta +	strength and presence of clusters 338, 342
Cb) (A) 158–167	zero-dimensional singularities 601
Transgranular cracking in stress corrosion	Vacuum melting of Zircaloy-2
539, 546-548	effect on corrosion resistance. 249, 253, 258
brittleness in	Vacuum reduction of ferric oxide 129-141
corrosion current in (F)	absence of CO at high temperature . 129, 134
electrochemistry of	by solid carbon
sound effects during 547	change of crystal structure 136, 138-141
Transient instability in torsion (A) 567-579	degree of reduction with temperature
Transverse properties of large steel ingots 31	133, 134
Treasurer's Report	diffusion law analysis (F) 135-137
Troostite, definition	gas composition with various temperatures
True spacing vs. mean spacing (pearlite). 107	(F)
True stress-strain testing 481, 484	procedure
need of better procedures	rate determining process 129, 136, 141
nomenclature for	reduction curves at various temperatures
procedure on sheet	(F)
strength measuring parameters 484	results with discussion 132–141
True stress vs. true strain	samples
of V, annealed and cold-worked (F) 150-153	schematic of apparatus (F)
Tungsten	Valence
effect on 1500 F properties of Fe-18Ni-18	influence on K factor in diffusion (F)
Cr + C, B and Mo (T) 537, 538	230, 231

Vanadium	results on 1040 steel
arc-cast ingot (F)	use of sound during
bend ductility	Wear test pins (1040 steel)
cold rolling, effect on hardness (F) 155	hardness with depth (T)
composition (T)	metallography (F)
ductility vs. temperature (F) 146, 148	preparation
effect of annealing on properties 146	temper brittleness
elastic modulus (T) 153, 154	Wire, hard-drawn torsion tests
Erichsen tests on annealed and cold-worked	torsion tests 577, 578
(T) 155	Work hardening
extrusion data (T)	in vanadium
fabrication	Work softening 331, 338
hardness (T)	Work strengthening 623-629
hardness vs. reduction 154, 155	Wrought lead-cadmium-nickel alloys (A)
impact strength	96-105
interstitial elements, effect on strength prop-	Wüstite to metallic Fe 136, 139-141
erties (F)	_
load-elongation curves for annealed and cold-	x
worked and to determine strain-aging	X-ray diffraction analysis
(F), 149, 150	of A-286 alloy (T)
mechanical properties (A) 143-157	of carbides from Cr-Mo-V steel 215, 216
notch sensitivity at room temperature (F)	of diffusion couples
149, 150, 156	of Ni-4.5Al-3.5Ti alloy (T) 591, 594
percentage in carbides with austenitizing	of phases in diffusion couples of Al-Ni and
temperature (F)	Ni-U
percentage in carbides with tempering tem-	of 410 stainless steel 516, 517
perature (F)	of Ti-8Al-8Zr-1 (Ta + Cb) 159, 161
plastic flow constants (T)	of vanadium
preferred orientation in annealed and cold-	of Y-Al system 168, 169, 173, 175
worked (T)	X-ray diffraction technique for stress measure-
strain-aging phenomena	ment 404, 405
145, 146, 149, 150, 156 strain-hardening coefficient and exponent (T)	X-ray examination in equilibrium study
191 190	558-560
tensile tests	X-ray patterns
true stress-true strain diagram (F). 151, 152	of Al-Ni diffusion zones (T) 262
yield point phenomena (F) 147, 149	of Ni-U diffusion zone (T) 265, 267, 268
yield strength vs. temperature (F). 145, 147	
work hardening	Y
x-ray diffraction analysis (T) 156	Yield behavior at low strain
Vapor pressure	of certain alloy steels (A) 413-429
of Mg vs. temperature (F)	Yielding in Griffith-Irwin test specimen (F)
Voids	476
in Armeo iron	Yielding
in steel	in highly stressed materials, relationship to
III steel	test values and properties of material
w	477
"	in stress-affected zone of bearing inner race
Warm prestressing	397
Warm prestressing definition	Yield-point phenomena
of H-11 tool steel, effect on notch properties	Yield-point phenomena in 4340 steel
454, 455	of alpha iron
'Weak link" phase	of vanadium (F)
ferrite in 422 stainless steel 41	Yield strength
Wear, metallic	of medium-C steel, Al-killed with additions
definition	of Cb (T)
factors which affect	of vanadium vs. temperature (F) 145, 147
theories for	Yield stress, definition
Wear rate transition in steel 276, 277	
Wear rate vs. load	Yield-tensile strength ratio of low-C martensitic steel
for 1040 steel (F)	of 4340 steel
• • • • • • • • • • • • • • • • • • • •	Yield zone measurements in fracture toughness
Wear test	1 leid zone measurements in macture toughness
Wear test procedure and apparatus 278, 279	mathematical analysis

Yttrium properties	frequency distribution of 112 day corrosion in steam (F)
solubility in liquid Bi (F) 186, 187, 197	melting and fabrication (F) 20, 21
Yttrium-aluminum system	normal corrosion rate
incipient melting 169, 170	Zircaloy-2 oxygen alloys
intermediate phases in 168, 169, 172, 173	chemical analysis
metallography	cold fabricability
microstructure (F)	hot fabricability
phase equilibria (A)	strip chemical analysis (T)
thermal neutron capture cross section 168	strip oxygen analysis (T)
x-ray diffraction analysis. 168, 169, 173, 175	Zirconium
1103 4111401011 411143 41114 4114 4114	anomalous behavior for self diffusion 235
Z	as inhibitor of corrosion 192
Zener-Hollomon adiabatic fracture theory	corrosion resistance (F)
568, 578	corrosion with heat treatment and 257
Zinc, single crystal	composition of sponge
c/a ratio	effect of oxygen on properties 20
concurrent straining in annealing. 331, 332	effect on solubility of noble metal fission
effect of annealing	products in Bi (T) 192, 199
orientation (T)	solubility in liquid Bi (F) 193, 197
preparation	transformation HCP to BCC, calculation
shear deformation (A)	235
stress-strain curves (F)	Zirconium alloy, Zircaloy-2
Zircalov-2	See Zircaloy-2
cooling from alpha and beta region, effect on	Zirconium-nickel system
corrosion behavior 257, 258	See Ni-Zr system
	Zirconium-rich eutectoid in Ni-Zr system (F)
composition	582, 583
	Zirconium-Ru-Bi system
resistance (A)	550 C liquidus (F)
effect of Fe, Ni, Sn, and Cr on corrosion	Zirconium-1.45Sn-0.14Fe-0.1Cr-0.05Ni
behavior	
effect of oxygen on properties (A) 20-30	corrosion resistance 247-259